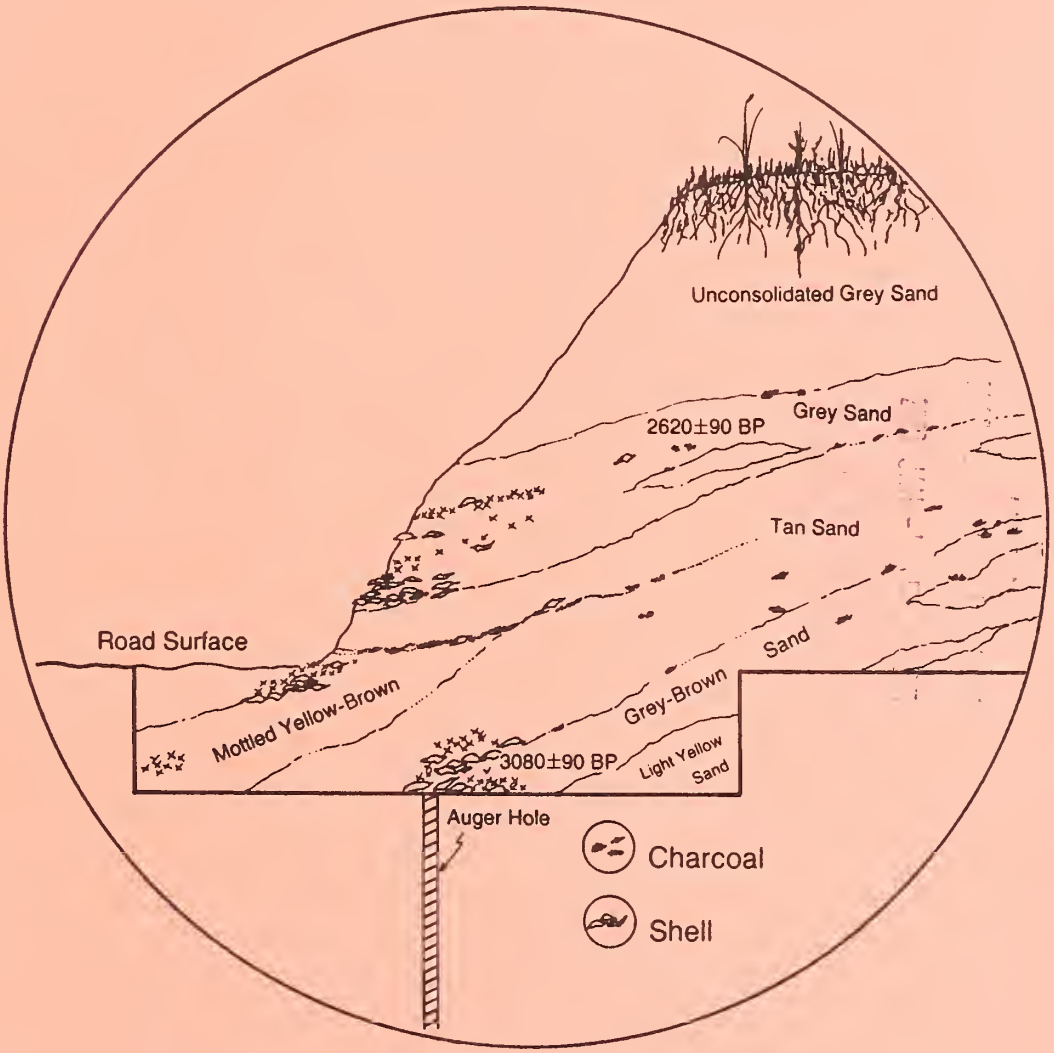
United States
Department
Agriculture

Forest Service

Pacific
Northwest
Region

Shell Midden Excavation on the Siuslaw National Forest



Studies in Cultural Resource Management no. 11

Billee W. Hoornbeek, Editor

Studies in Cultural Resource Management

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* On the cover of the 1984 reprint the author's name is misspelled as Beckman

* On the cover, this volume was inadvertently misnumbered as No. 7

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EDITOR'S PREFACE

The Cultural Resource Management program on the Siuslaw National Forest began in 1978. For the next 10 years a Forest Cultural Resource Coordinator was selected within the Recreation section to oversee the Forest program. Under the leadership of Bonnie Wood and then Richard Lilja, and with the assistance of the Regional Archeologist, James Keyser, the program addressed compliance and responded to mitigation needs.

During this period the forest contracted a number of site specific surveys and excavations. Two of these were data recovery excavations--one at Lake Tahkenitch and the other at Cape Perpetua. Excavations at Cape Perpetua were conducted as a mitigation project for the installation of a pedestrian underpass under Highway 101 in 1983. During this project, major excavations were conducted at the Good Fortune Cove site (35LNC56) and a smaller test excavation was done at the Good Fortune Point site (35LNC55). Excavation was conducted at Tahkenitch Lake in 1985 to ensure that the site would not be damaged by construction for the Tahkenitch Landing recreation site. These projects made noteworthy contributions to the understanding of prehistoric lifeways on the Central Oregon Coast. Of particular importance was the discovery of occupation at Tahkenitch Lake that dated to 8000 years before present. As of this writing, Tahkenitch remains the oldest known site on the Oregon coast. Additionally, the information from these sites provided the basis for the renovated prehistoric interpretive display at the Cape Perpetua visitor's center.

In 1988 the Forest hired me as their first professional archeologist. One of my highest priorities was to conduct a comprehensive review of the known coastal shell midden sites on the Forest to verify their continued existence and current condition. Jim Keyser and I designed a north-south survey for the summer of 1989.

We began on the Forest land east of Cape Lookout and visited all previously recorded sites. One site, at Sand Lake that had been recorded, but not numbered had disappeared under the encroaching sands. The site will continue to be monitored.

The four sites at Cape Perpetua, first recorded in 1980 by Bruce Buckley, Cultural Resource Technician from the Waldport Ranger District, have yielded and will continue to yield information that is vital to our understanding of past lifeways on the Oregon Coast. In 1982 Keyser and Buckley auger tested each of these sites and recorded their condition and potential for research and interpretation. During our 1989 fieldwork, using Keyser's previously unpublished study as a basis, we compared the current condition of each site to its 1982 condition.

One site (35LNC57) had been severely impacted by an unplanned footpath worn down the face of the midden. After verifying this damage, we met with Waldport Ranger District personnel and outlined the steps needed to mitigate this impact. A plan was prepared to stop the ongoing damage, and build a path to provide alternate beach access. It was also decided that scientific excavation was the only alternative for acquiring data about the midden and truly stabilizing the damage in the impacted area. The District further decided that the excavation would be conducted during the tourist season so that a maximum number of people would have the opportunity to view the project while it is in progress. Since Keyser's testing and site evaluations provided the background for all of the subsequent work at Cape Perpetua, I decided that his testing report should be published in this volume so it would be available to the scientific community.

As the finalization of our shell midden survey, we planned an extensive trip to the ODNRA to visit a number of sites with the Cultural Resource Technician, Gene Large. Gene was particularly concerned

about one site (35CS114) where an access road to the dunes for All Terrain Vehicles was disturbing what appeared to be a small midden. We were very interested in this site because it was such an anomaly--all alone out in the dunes, more than a mile from water and at least 3 miles from any present-day shellfish habitat. The erosion of the visible midden was extensive enough that Keyser and I decided that a test excavation was necessary to determine the depth and contents of the midden. Accordingly, a 1 X 1 meter unit was opened. The results of this testing proved conclusively that the site had been occupied prehistorically over a relatively long period of time and was not an historic shell dump. Later, auger testing demonstrated that the site extended at least 66 meters N-S and 16 meters E-W. The sharp W-E declination of the shell deposit strongly suggested that the shell had originally been discarded down the sloping face of a dune on the bank of an estuary. Along the eastern edges of the known midden deposits shell was recovered under water. This suggests the possibility that there may be drowned "wet site" deposits.

Our report of the test excavation of 35CS114, the Hauser site, is also published in this volume. Presently the access road that impacted the site has been relocated and plans are moving ahead for 1992 data recovery from this very important site.

In summary, this report continues a ten-year tradition on the Siuslaw National Forest of professional investigations of central Oregon coastal shell midden sites. Based on the results of this research and previous excavation projects, the future of shell midden archaeology on the Siuslaw appears bright, indeed. I suspect that excavations planned for coming years will yield significant new information concerning Oregon coast prehistory.

Acknowledgements

I would like to thank Jim Keyser for his support to the Forest over the last 12 years. He has given unstintingly of his time and professional expertise. As a result, the Siuslaw National Forest has funded projects that have added substantially to the scientific body of knowledge about the prehistory of the central Oregon Coast. I would also like to thank Jim for taking the lead in publishing the Hauser site report. Without his tenacity it would not have been completed. I would also like to thank two Cultural Resource Technicians, Bruce Buckley and Gene Large. Without their obvious interest in and concern for the resource and their commitment to doing the cultural resource management job on the Siuslaw National Forest, none of these sites would have been recorded, let alone studied. Bruce, Gene, and their counterparts on all other Ranger Districts on the Siuslaw are truly the heart of our cultural resource management effort.

Billee W. Hoornbeek

THE CAPE PERPETUA SHELL MIDDENS:

AN EVALUATION REPORT OF FOUR SITES
AT THE CAPE PERPETUA SCENIC AREA,
SIUSLAW NATIONAL FOREST

James D. Keyser

1991

PREFACE

This report was originally written in the fall of 1982 as a determination of eligibility for four shell middens at the Cape Perpetua Scenic Area on the central Oregon coast (Keyser 1982). The report was a description of fieldwork carried out by the author and Bruce Buckley, cultural resource technician on the Waldport Ranger District of the Siuslaw National Forest, during the summer of 1982. Subsequent to the completion of this report, data recovery excavations were conducted at 35LNC56 and a small test excavation was done at 35LNC55 (Minor et al 1985). Additionally, removal of dead vegetation at site 35LNC54 revealed that this midden is much larger than was originally reported here.

The decision was made to publish this report because it had not been previously distributed to professional colleagues, and because additional excavations may soon be necessary at another of these middens. During the 1983 excavation at 35LNC56, it was discovered that erroneous site numbers had been assigned by the Oregon SHPO. In this published version the site numbers have been changed as per Minor et al (1985). Otherwise no changes have been made to reflect the new data from these Cape Perpetua sites or the research which has been conducted at several other locations including Yaquina Head, Tahkenitch Lake, or Hauser.

Photographs appearing in the original unpublished report are not reproduced here.

INTRODUCTION

Cape Perpetua, on the Waldport Ranger District of the Siuslaw National Forest, is located on the Pacific coast of central Oregon approximately 20 miles north of Florence and 10 miles south of Waldport (Fig. 1). The area is currently managed as a recreation visitor information facility to highlight the spectacular natural features of the rugged ocean headland. These features include tidepools, surf-cut rocky beaches, and dense Pacific rain forest. Recreation facilities include a visitor center, hiking trails, picnic areas, roads, and a developed campground.

Within the Cape Perpetua scenic area are four small shell middens that indicate the location of prehistoric Indian occupation/food processing sites (Fig. 2). These middens appear as thick lenses of crushed and broken mussel shells, barnacles, fire-broken rock, and charcoal eroding from cutbanks along the seaward sides of the low headlands on which they sit. This report documents a preliminary examination of these middens in order to ascertain their scientific research potential and determine their eligibility for listing on the National Register of Historic Places.

The Area's Environment

Cape Perpetua is a rugged North Pacific coastal headland formed where massive basalt mountains of the Oregon Coast Range rise from the Pacific Ocean. The wave-cut shoreline here consists of sheer cliffs towering above exposed basalt ledges that are dotted with tide pools, cobble beaches, and tidal features such as spouting horns and the Devil's Churn.

Fig. 1 Location of Siuslaw National Forest on Oregon Coast. Arrow indicates location of Cape Perpetua.

The steep mountain slopes and Cape Creek valley are covered with a dense evergreen rain forest composed of Sitka Spruce and Douglas-fir. Underbrush is composed of dense thickets of salal, rhododendron, and salmonberry. Coastal vegetation includes beach grass and salal on the lower windswept headlands and a variety of under sea plants below the tidal margins.

The area's fauna includes deer, bear, and smaller mammals inland. The highest biomass occurs in the tidal and near-shore zones of the ocean. Here the fauna consists of marine mammals such as whales, seals, and sea lions; edible molluscs including limpets, barnacles, mussels, razor clams, chitons, and sea snails; and crabs and numerous species of fish. Other animals include sea urchins, sea anemones, sea stars, and a variety of smaller creatures. Concentrations of cormorants, gulls, and other sea birds use the rocky headlands and off-shore rocks as rookeries and nesting grounds, and these areas also attract seals and sea lions. The richness of the intertidal zone fauna is certainly one of the main attractions for prehistoric occupation of Cape Perpetua.

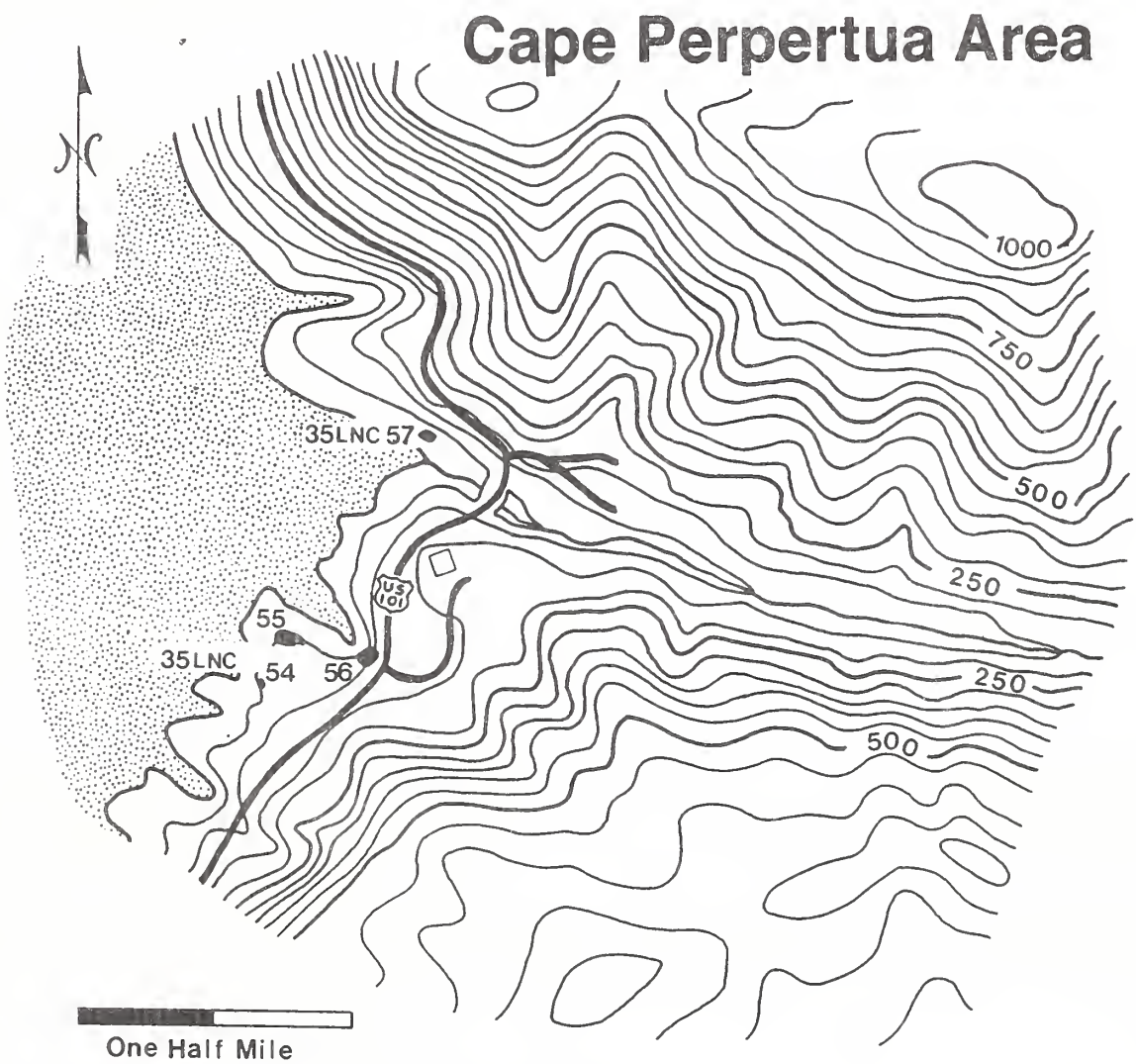


Fig. 2 Contour map of Cape Perpetua locality showing site locations.

Prehistoric Background

The prehistory of the central Oregon coast is poorly known (Beckham et al. 1982). This is due to a combination of factors including the few sites investigated in the region, the preliminary nature of most investigations, and the paucity of finished reports detailing the results of the work so far completed (Beckham et al 1982:143-146). Nevertheless, some limited inferences concerning prehistoric coastal adaptations have been made.

All archaeological sites so far investigated on the central Oregon coast date within the last 3,000 years and most were occupied during the last 500 years (Beckham et al 1982:143, 163). Hence it seems likely that most of these sites were occupied by the direct ancestors of the Indian groups who inhabited this area in historic times. The relative recency of occupation of these sites is not necessarily indicative of the true span of coastal adaptation, however, since it is theorized that rising sea levels have probably submerged or destroyed older coastal sites.

Preliminary evidence suggests that the rugged topography of the Coast Range Mountains apparently isolated most northern coastal groups from cultural developments in the Willamette Valley and other interior areas (Cressman 1953). Although there is ethnographic documentation of some trade and travel, archaeological research has so far produced little evidence of such contacts (Beckham et al 1982:164).

Since so few sites have been excavated in the area, little is known of the settlement/subsistence systems of these coastal groups. Some sites such as Seal Rock contain extensive evidence of sea mammal hunting (Snyder 1978), others are almost exclusively composed of mussel shells, and still others consist of mixed deposits of bay clams, fish, and land mammal bones (Barner 1981). At present it is not known whether this variety represents seasonal or areal variation in available resources, cultural preference, or other factors.

Almost nothing is known of the social organization and integration of these coastal groups. House structures are known from the Netarts Bay site (Newman 1959), the Umpqua/Eden site, and Bullards Beach (Beckham et al. 1982:155-156) and a few burials have been recovered. In addition, the ruggedness of the coastal topography is thought to have inhibited north-south travel (much like the Coast Range separated these people from the Willamette Valley) and possibly helped create a number of localized coastal groups each distinct in some ways from their neighbors. However, data adequate for determining group size, composition, and structure and for ascertaining the nature and extent of intergroup interaction have not yet been collected.

In summary, present knowledge of Central Oregon Coast prehistory is incomplete. The area does not yet have a detailed chronological framework within which to place sites or components. Lacking this basic requirement few data have been synthesized to determine settlement patterns and subsistence systems, or to answer questions concerning societal organization and integration.

THE SITES

Four prehistoric shell middens were identified at Cape Perpetua. These are sites 35LNC54, 35LNC55, 35LNC56, AND 35LNC57.[1]

Site 35LNC54 is situated on a low headland approximately 200 feet south of 35LNC55 (Fig. 3). This midden is a small, thin deposit of crushed and burned mussel shells exposed in a low cut bank between a paved footpath and the beach (Fig. 4). The midden is approximately 20 feet long and 12 feet wide.[2] Auger testing exposed midden material east of the footpath, 12 to 14 inches below ground surface. In the auger hole just east of the path a moderately dense midden at least 6 inches thick was encountered. At 20 inches below surface the auger probe was stopped by a rock. The midden exposed here had similar quantities of material as those exposed at the cut bank. The second auger hole appeared to be near the east edge

of the midden. A few broken shells were encountered between 12 and 20 inches below surface, but not in concentration such as the other auger probe or the central area of the cut bank. In the easternmost auger hole the sparse midden material rested on sterile yellow sand as it did in the exposed cut bank. In material density the midden from this hole resembled that exposed at the southern end of the cut bank.

Construction of the footpath may have damaged a narrow swath through the center of the midden; however, if there was a 12- to 14- inch soil cover in this area prior to construction, the site probably has not been disturbed.

In shape and size the Midden at 35LNC54 is very similar to some components in part of 35LNC55. Cultural material exposed is a 6-inch thick layer of crushed mussel shell and fire broken rocks. Scattered charcoal flecks were also noted. The heaviest concentration of shell was in the approximate center of the midden with remains becoming increasingly sparse toward the north, south, and east margins. No bone, clam shell, barnacles, or tools were noted, but only a limited portion of the midden was exposed. On the basis of surface evidence it appears that this Midden may represent a single use episode where a catch of mussels was processed and eaten.

Site 35LNC55, is a large midden (Fig. 5) on a high headland above the ocean beach directly west of the visitor center turnoff. A large interpretive sign at the site's southeastern boundary identifies this as a shell midden. The midden extends approximately 150 feet along the cutbank of the headland and approximately 50 feet back from the shoreline cutbank. Auger probes and cutbank exposures show that midden accumulation is a series of overlapping lenses of crushed and burned shell that form a deposit at least 5 feet deep. The effect is to create a mound of debris on the headland. Lenses of cultural material range from solid mats of shell 6 to 8 inches thick to sparse scatters of shell fragments in a greasy black soil matrix. Cultural materials in the site include musselshell, acorn barnacles, sea mammal bones, clamshells, charcoal, and fractured rocks. Although more than 80% of the midden is crushed musselshell, the site has a more varied content than any other of the Cape Perpetua middens. Several clusters of reddened, fire-fractured beach cobbles associated with lenses of charcoal and charred shell indicate the location of fire hearths. The multitude of overlapping levels of shell in this midden imply a multi-component site used repeatedly by groups over a relatively long period.

According to the SHPO, one or more burials has been reported in the past from this midden (Le Gilsen, personal communication 1982). However, no evidence of any burial was noted during my intensive surface reconnaisance of the entire 35LNC55 site area.[3]

Because this site is presently interpreted for the public, only minimal auger probing was conducted. Dimensions were identified by using the two auger holes, examining exposed cutbanks along the midden's western perimeter, and noting the presence or absence of shell fragments in rodent mounds and footpaths along the eastern edge.

Three circular to ovoid depressions 10 to 15 feet across and averaging 1.5 feet deep were noted in the crest of 35LNC55. These may be the housepit depressions reported on the original site form, or they may be rehabilitated area's of vandal's excavations. Positive identification awaits future excavation.

The Midden at 35LNC56 is a single component shell midden located just west of Highway 101 at the Cape Perpetua Visitor Center's entrance (Fig. 4). The midden is a layer of mixed shell fragments, broken stone, and organic-enriched soil exposed in the cutbank at the head of a deep ravine. Heavy vegetation obscures most of the ground surface here, so auger holes were dug in a grid pattern across the site area (Fig. 6) to identify the horizontal and vertical extent of the midden (Table 1). Coupled with the cutbank exposures, these showed that the midden is buried between 2 and 19 inches deep, but the overburden in several areas is the result of fill laid down during the construction of Highway 101 and the asphalt footpath leading to the beach. The midden extends approximately 50 feet north and south and 35 feet

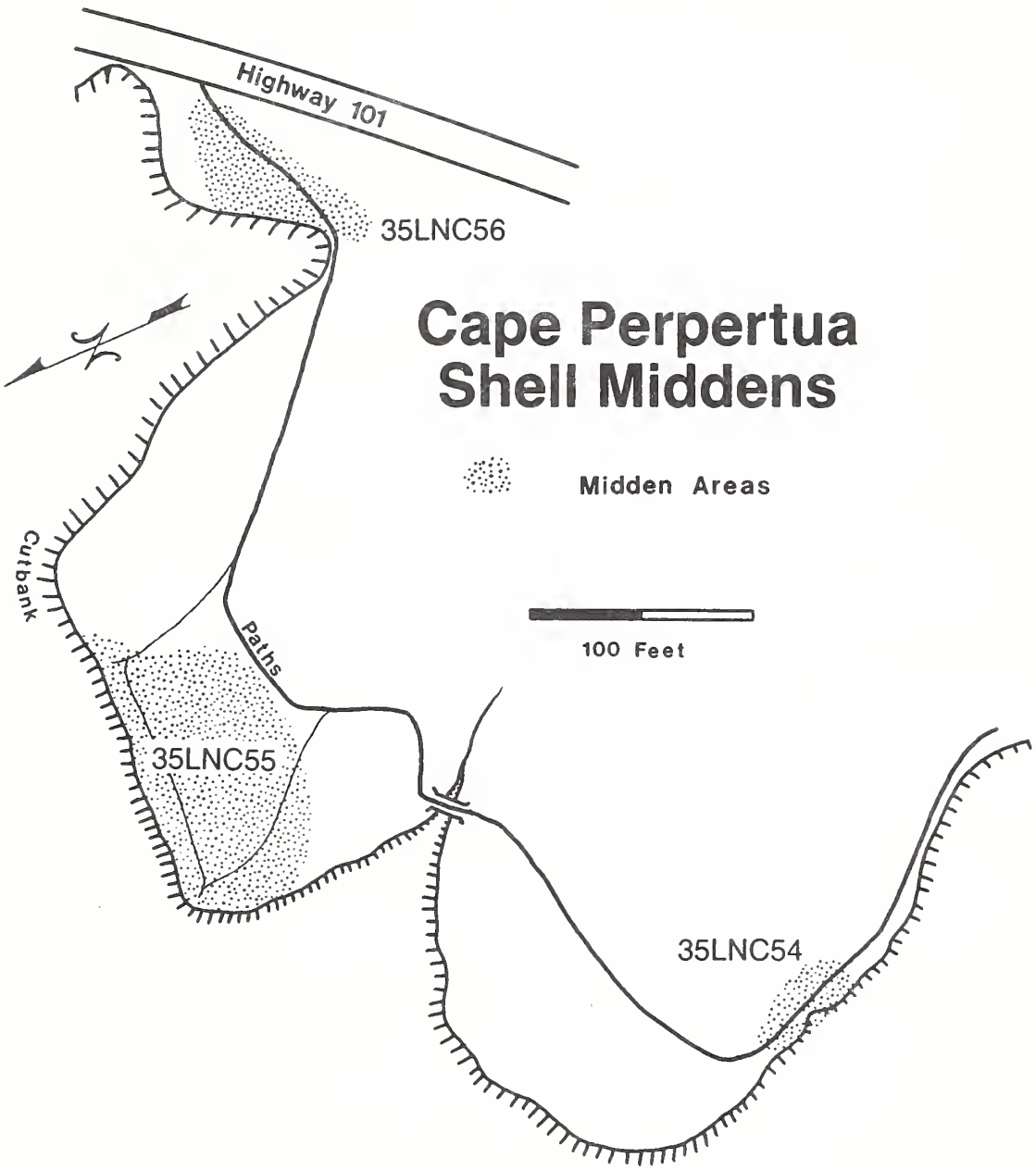
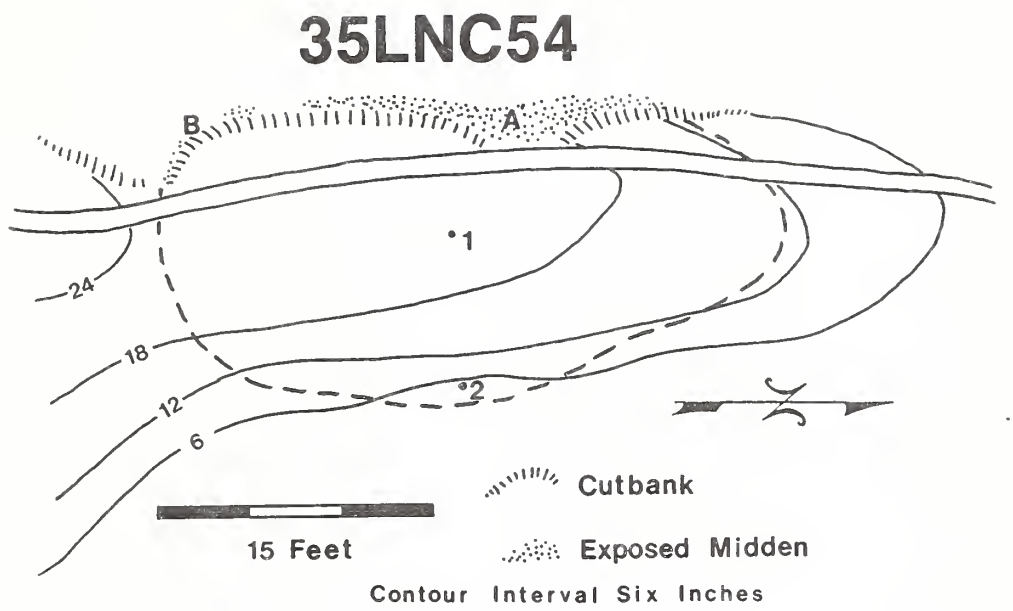


Fig. 3 Location of middens at Cape Perpetua



A. Exposed cutbank. Moderately heavy midden material 6-10 inches thick, also litters beach here. Some charcoal flecks and fire broken rocks.
B. Sparse midden exposed in cutbank. Occasional shells only.

1. Auger hole. Midden encountered 14 inches below surface. Moderate midden material. Auger stopped by rock at 20 inches below surface still in midden.
2. Auger hole. Midden encountered 12 inches below surface. Very sparse midden material. At 20 inches below surface sterile sand encountered.

Fig. 4 Plan map of 35LNC54 showing midden exposure and auger holes. Dashed line indicates site boundary.

east and west, although it cannot be determined whether any part was destroyed or buried by road construction. Rodent burrows have disturbed the bottom margin of the midden to a limited extent, but not enough to destroy context.

TABLE 1

Results of Auger Testing 35LNC56

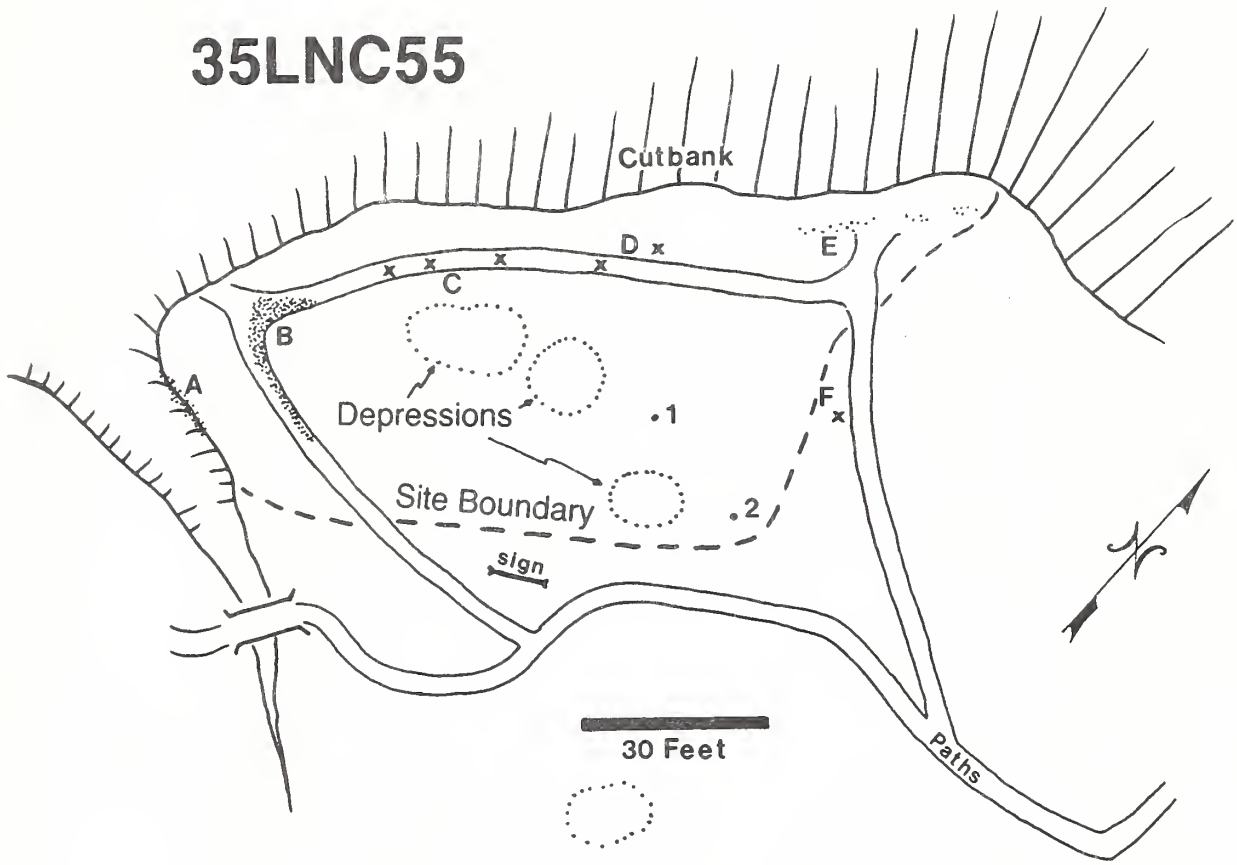
Auger Hole/ Cutbank Exposure	*Midden Thickness Inches Below Surface*	*Midden Density*
1	-	Sterile from surface to 43"
2	19" - 35"	Heavy
3	3" - 23"	Moderate
4	2" - 20"	Very heavy
5	2" - 26"	Heavy
6	11" - 34"	Heavy
7	4" - 25"	Heavy
8	2" - 26"	Heavy
9	2" - 13"	Moderate
10	2" - 18"	Moderate
11	3" - 15"	Moderate
12	7" - 21"	Sparse
13	-	Sterile road fill
14	13" - ?	Very sparse
15	15" - 19"	Very sparse

Cultural materials in this Midden include approximately 95% mussel shells, with small amounts of fire fractured rock, barnacles, and large bone fragments. Snail shells at the top of the midden are the local terrestrial species so it cannot now be determined if they are simply the local fauna in the vegetation mat covering the site or if they were used as a food resource. Small flecks of charcoal were found in the area profiled along the cutbank. These and fire fractured rocks suggest that hearths occur in the midden even though none are exposed in the cutbank.

The midden material here is contained in a blackish-brown, loose textured, friable soil that extends from the root zone to approximately 20 inches deep (Fig. 7). The midden rests on a brownish-tan, blocky textured clay soil that is similar to the subsoil exposed in the ocean cutbanks elsewhere in the Cape Perpetua area.

35LNC56 is scheduled to be impacted by construction of a proposed pedestrian underpass under Highway 101. The central and richest portion of the midden will be removed by construction of the underpass portal and drainage system. A data recovery plan adequate to provide a No Adverse Effect determination is being prepared for this site. [4]

Site 35LNC57 is a deep accumulation of mussel shells on the north bank of Cape Creek where it enters the Pacific Ocean (Fig. 2). The midden exposed in the beach cutbank (Fig. 8) is between 5 and 6 feet deep and extends along the cutbank for approximately 70 feet. Crushed shell and charcoal-stained soil in rodent mounds and a single auger hole indicate that the midden extends at least 50 feet back into the cutbank (Fig. 9) to a break in slope where there is a constructed footpath. No cultural materials were observed on the slope above the footpath.



A. Cutbank exposure. Moderate midden material 12-14 inches thick, One lens.
B. Dense midden material exposed in footpath.
C. Dense midden material exposed in rodent burrows.
D. Sparse midden material exposed in rodent burrows.
E. Sparse midden material exposed in cutbank.
F. Rodent burrow with no midden material.

1. Auger hole. Moderate to heavy midden encountered at 10 inches below surface. At 49 inches deep sterile orange-yellow sand encountered.
2. Auger hole. Sparse midden encountered between 12 and 30 inches below surface. Below 30 inches sterile sand encountered.

Fig. 5 Plan map of 35LNC55 showing midden exposures and auger holes. Dotted ovals indicate possible house pit depressions. Dashed line indicates site boundary.

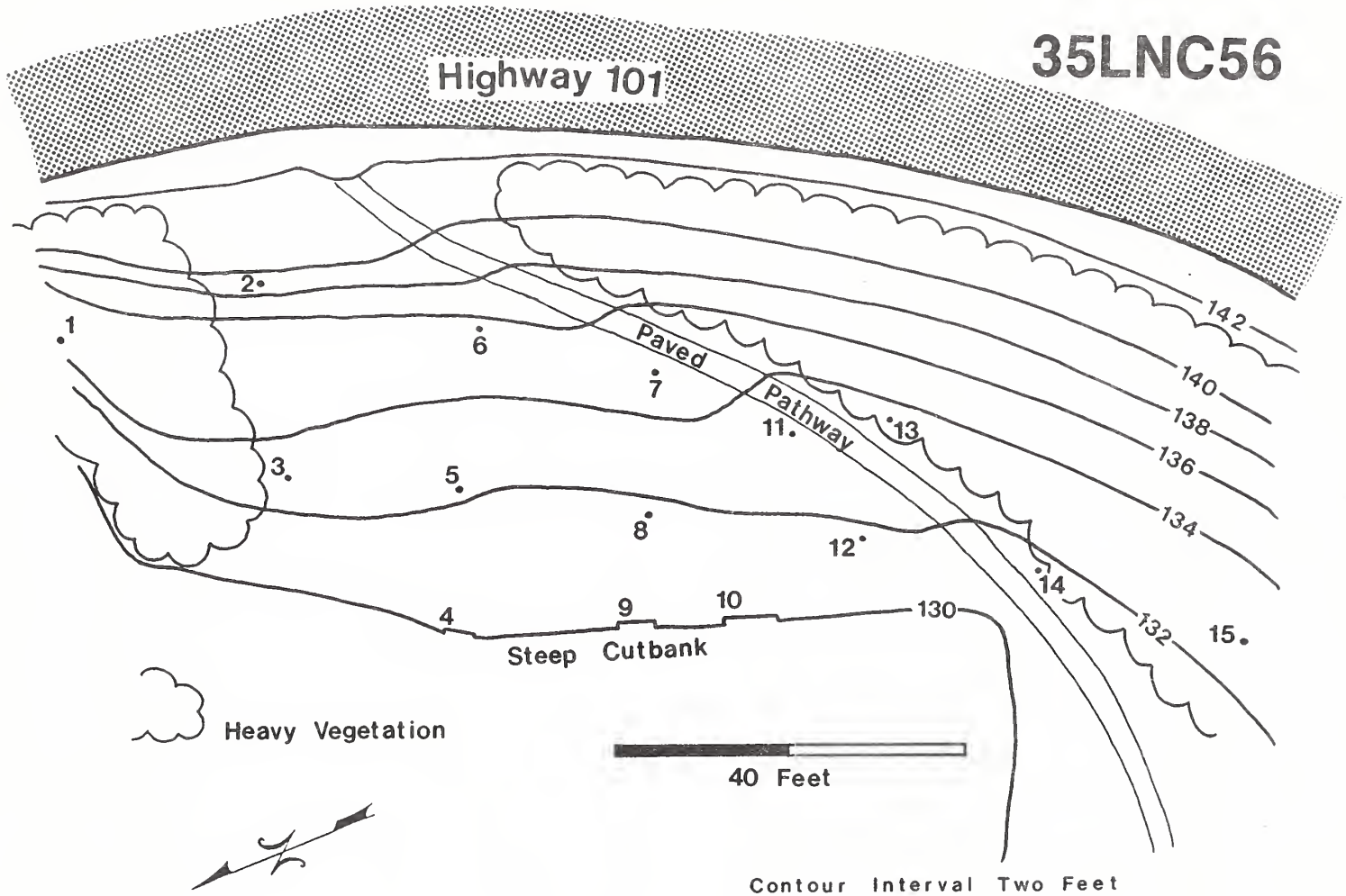


Fig. 6 Plan map of 35LNC56 showing location of auger probe holes and cutbank exposures. See Table 1 for description of midden exposures.

Site 35LNC57 appears as a single component, densest in the approximate center of the exposure. Unlike 35LNC55 it does not appear as a series of overlapping lenses, but rather as a nearly solid mat of moderately dense crushed shell throughout its thickness. Cultural materials include crushed mussel shell which composes more than 80% of the midden, and small amounts of fire-fractured stones, charcoal, barnacles, limpets, and mammal bones. Although no firehearths were exposed in the cutbank, the quantity of charcoal and fire broken rock indicate their presence in the midden.

Stratigraphy of this site is fairly simple. The basal stratum is a shelf of basalt bedrock exposed by Cape Creek and the ocean. Above this is a 6 to 9 foot thick layer of large boulders and cobbles. Apparently this boulder gravel is an alluvial deposit of Cape Creek since the stones are not worn as smooth or as flat as the boulders and gravel on the beaches in this area. Directly atop the cobble deposit is a dark brown to black soil 6 to 10 inches thick that apparently developed on the cobble stratum. Above this is the shell midden, extending upward to the current root zone.

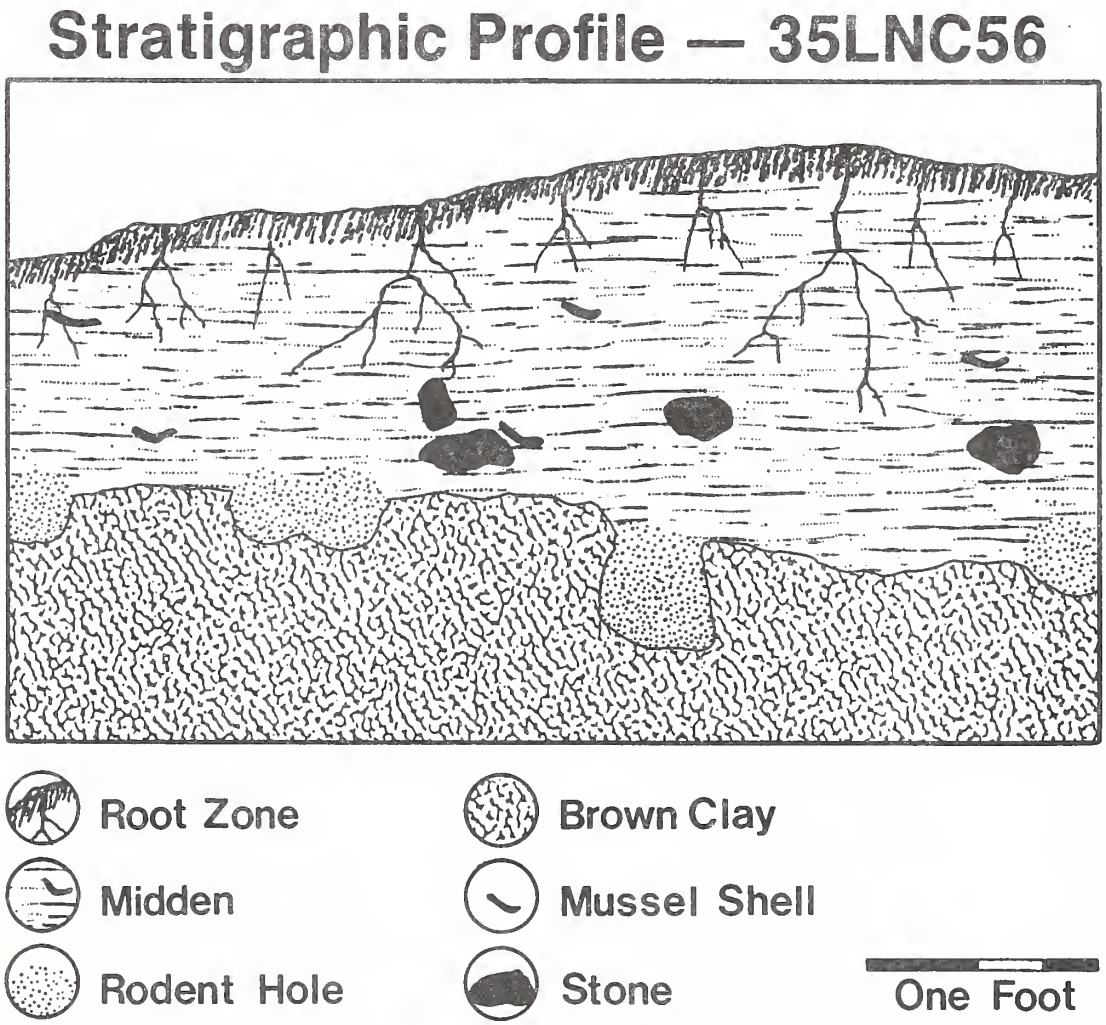
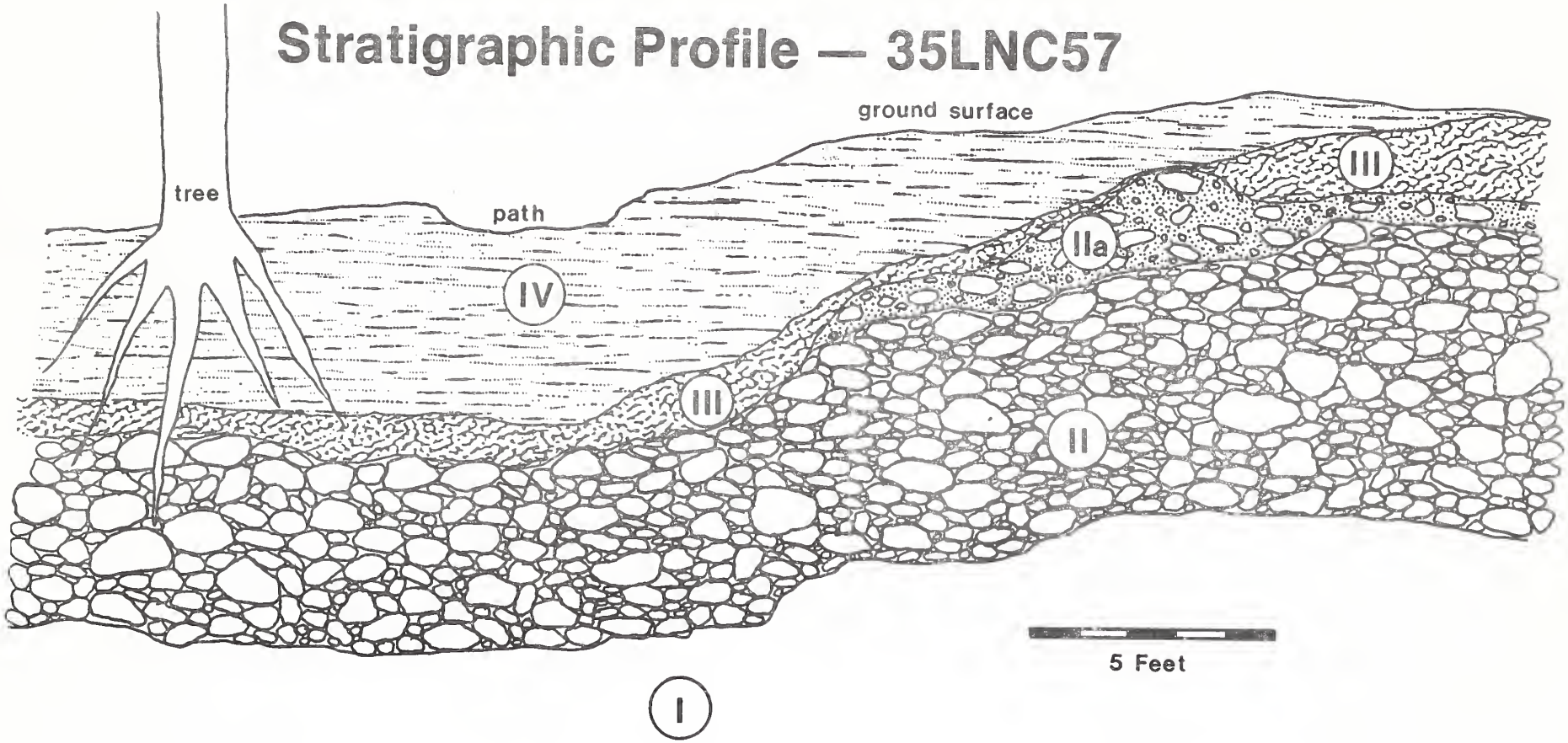


Fig. 7 Profile of midden at 35LNC56. Profile drawn at Number 10 on map--Fig. 6.



I. Basalt Bedrock

II. Basalt cobbles with Gravel Matrix.
Cobbles and gravel are 1-24 inches in maximum dimension. Cobbles appear to be stream laid, as they are more angular than beach gravel/cobbles in the area. Probably they are deposited by Cape Creek.

IIa. Heavily oxidized portion of II.

III. Dark brownish-black soil developed atop cobble deposit.

IV. Midden composed of musselshell, bone, and stone.

Fig. 8 Profile of exposed cutbank at 35LNC57

EVALUATION

All four shell middens at Cape Perpetua appear to meet National Register of Historic Places criterion d (36 CFR 60.6d) indicating that they are all eligible for listing on the National Register.

All four sites are presently intact with the exception of areas damaged by natural erosion, some minor vandalism at 35LNC55, and my limited auger probing. Boundaries have been established based on exposure of cultural materials, auger probing, and physiographic features. Cultural materials at all sites include shell, firecracked rock, and charcoal, and the larger sites also include mammal bones. Given these characteristics it is apparent that each site can yield information relevant to the following three research topics: Local Chronology, Subsistence System, and Settlement Pattern.

Local Chronology

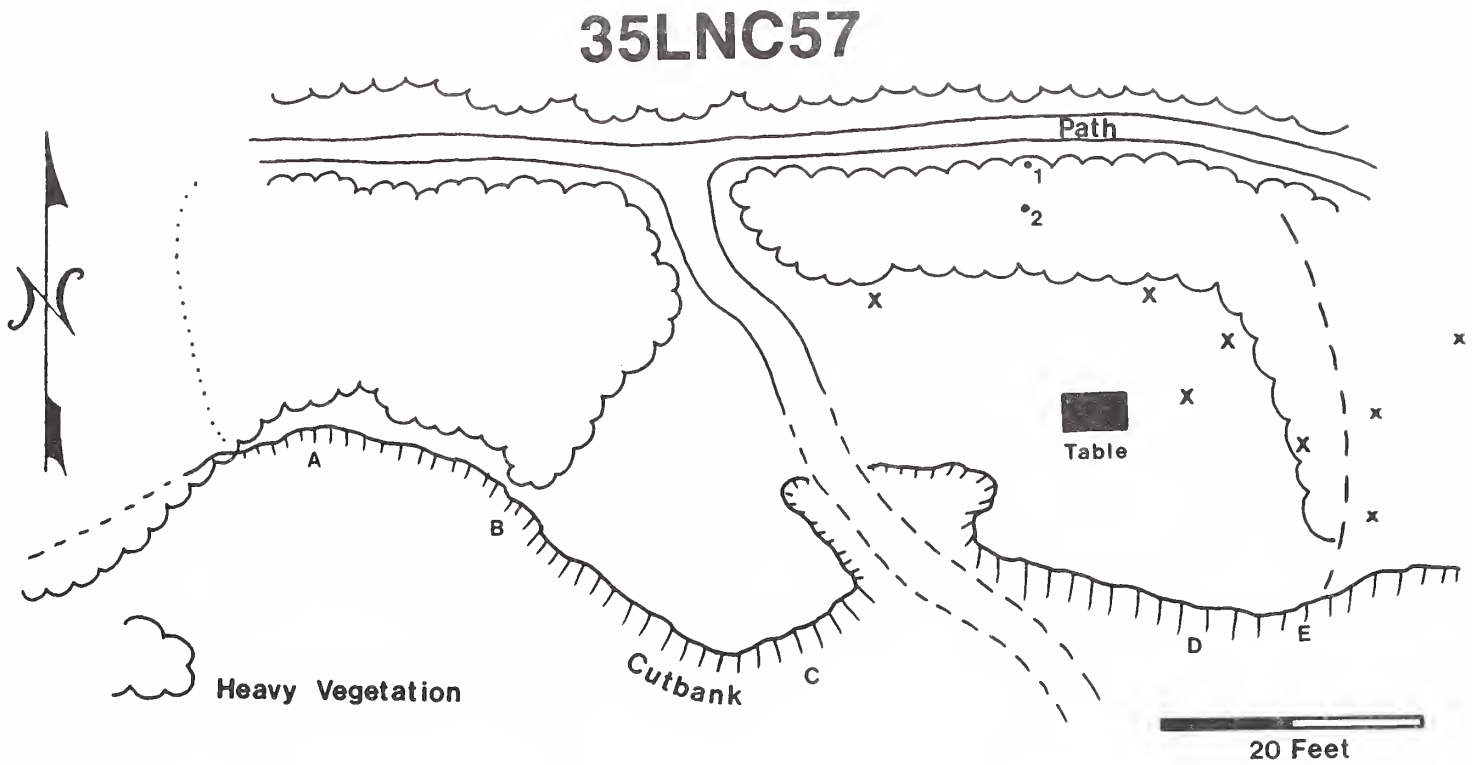
Establishing local chronologies is of paramount importance in Oregon, and especially on the Oregon coast, because most areas of the state lack an adequate chronological matrix within which to place recovered archaeological data. Each of these sites shows strong evidence of containing charcoal and bone that can be radiocarbon dated to provide an age for occupation. No single site is likely to span the entire period of coastal use (in contrast to some Great Basin cave sites that show 12,000 years of occupation) but the sum of many dated components will eventually enable the definition of a local chronology for the Oregon Coast. In this regard all of these sites are important because the smaller middens may represent periods when the large sites were not occupied.

Subsistence System

Variation has been noted in the resources exploited at other coastal shell midden sites, but it is not known whether this represents seasonal or areal variation of available resources, cultural preferences, or other factors. All four Cape Perpetua shell middens have abundant evidence of the molluscan and mammalian resources that were exploited, and appropriate analyses should help determine the seasons during which various species were used. Since these middens are in the same area, resource availability at any single time should not vary from site to site. Therefore, appropriate analyses and comparison of recovered materials to these and other nearby sites (e.g., Neptune, Seal Rock), coupled with temporal control should indicate possible causes for any observed differences in resource exploitation between these sites.

Settlement Pattern

Little is known of the settlement patterns and seasonal round of activities of, or nature of intergroup contact between, groups occupying various portions of the Central and Northern Oregon Coast. In large part this is due to the few excavated sites in the area and the absence of research efforts directed toward studying these issues. Recent work (Barner 1981) has shown that several lines of evidence can be used to determine season of occupation of coastal midden sites. Data from possible structural features (such as hearths and houses), artifact assemblages, and midden contents should enable a determination of site function (e.g., village, temporary camp, food processing station) and composition of the group occupying the site (e.g. family group, band, special purpose task group). Furthermore, as techno-economic systems are fully studied and compared to those from all subareas of the coast it will be possible to infer relationships between various sites and complexes. This combination of seasonal, functional, and socio-economic data should yield the basis for beginning to determine the settlement patterns of the Central Oregon Coast area.



A. Cutbank exposure. Sparse midden less than 1 foot thick.
B. Cutbank exposure. Dense midden 2-3 feet thick.
C. Cutbank exposure. Dense midden 5 feet deep.
D. Cutbank exposure. Dense midden 2-3 feet deep.
E. Cutbank exposure. Sparse midden less than 1 foot deep. (For C, D, E, see profile--Fig. 8)

1. Auger hole. Sterile trail fill.
2. Auger hole. Encountered moderate midden at 15 inches below surface. Stopped by rock at 22 inches.

x's Rodent burrows showing midden material.
x's Rodent burrows without midden material.

Fig. 9 Plan map of 35LNC57 showing natural midden exposures and auger probes. Dashed line indicates approximate east boundary of site, dotted line indicates indistinct west boundary of site. Western boundary partially obscured by heavy vegetation.

In summary, all four sites at Cape Perpetua have the potential to yield data important to understanding coastal prehistory. No single site has all or probably even most of the answers, but coordinated study of all sites will provide data to establish a chronological framework and fill in the gaps in our knowledge concerning the social and economic systems of the prehistoric inhabitants of the Central and Northern Oregon Coast.

SUMMARY

Four shell midden sites at Cape Perpetua on the Central Oregon Coast are located and described in this report. All four sites are intact, culturally derived deposits of shells, rocks, charcoal, and bones. Natural erosion has exposed small areas of each site, but all remain largely undisturbed.

Data from these sites can be used to address three major research questions regarding coastal prehistory: (1) establishment of local chronology, (2) definition of subsistence system, and (3) delineation of settlement pattern. As such each site meets criterion d for eligibility for listing on the National Register of Historic Places.

Notes

1. In the original report (Keyser 1982) these sites were recorded as 35LNC26 parts A, B, and C; and 35LNC27. This was due in part to erroneous site locational data provided by the Oregon State Historic Preservation Office and the sites were subsequently renumbered as they are here by Minor et al (1985).

2. In early 1991 a significant freeze killed some of the heavy vegetation growing just east of 35LNC54. When this dead vegetation was removed it revealed that the site is much larger than originally indicated. No new boundary for the site has yet been determined.

3. It is suspected that the burials reported here were actually at site 35LNC26, about 1 mile to the north. There is no authenticated report of a burial at 35LNC55.

4. See Minor et al (1985) for a discussion of data recovery excavations at this site, and a test excavation of 35LNC55.

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TEST EXCAVATIONS AT THE HAUSER SITE (35CS114) ON THE OREGON DUNES NATIONAL RECREATION AREA

James D. Keyser
Billee W. Hoornbeek

1991

INTRODUCTION

The Hauser site, 35CS114, is a prehistoric shell midden located in the southernmost portion of the Oregon Dunes National Recreation Area (ODNRA), Siuslaw National Forest, on the central Oregon Coast (Fig. 1). Originally located in the early 1980's by F. Eugene Large, ODNRA Cultural Resource Technician, the site is approximately five miles north of Coos Bay in the vicinity of Hauser, Oregon. Although located on a private inholding within the ODNRA, the road through the area is a U.S. Forest Service permitted "All Terrain Vehicle" right-of-way used to access National Forest Lands. Thus, impact to the site from the road is a cultural resource management responsibility of the U.S. Forest Service, and a test excavation was conducted to determine the nature and extent of impacts that were occurring from road use. Initial test excavation was conducted on July 14, 1989 by a three-person crew consisting of James D. Keyser, Billee W. Hoornbeek, and Dianne G. Jensen. A year later (August 21 and September 10, 1990) additional auger probing was done by Keyser, Hoornbeek, Large, and Jim Krause to determine site boundaries.

Environmental Setting

The ODNRA is a long narrow strip of Central Oregon coastal dune field, containing 32,150 acres, administered by the Siuslaw National Forest. Comprising 38 miles of ocean frontage, it varies in width from less than 500 feet to 2 3/4 miles. It includes parts of Coos, Douglas, and Lane counties.

Located approximately 150 miles southwest of Portland, Oregon, access to the ODNRA is via US Highway 101, that roughly parallels its eastern boundary. The ODNRA is bounded on the north by the Siuslaw River, and on the south by Coos Bay, the estuary for the Coos River.

The active sand dunes of the ODNRA are probably its most important feature; approximately one-third of the total area is active, open dunes. Ocean beach frontage is the other primary ecosystem. Major rivers and streams that dissect the dunes are the Siuslaw, Umpqua and Siltcoos Rivers, and Tahkenitch, Threemile, and Tenmile Creeks. North Slough Creek, draining into the North Slough of Coos Bay estuary, is the major drainage in the vicinity of the Hauser site.

Climate

The central Oregon Coast has a temperate maritime climate, characterized by cool, dry summers and mild, wet winters. Average annual precipitation of 65 to 70 inches occurs mainly from November through March. Summer temperatures generally range from a high of 75 degrees, to a low of 45 degrees. Winter temperatures range from 30 to 50 degrees. Temperatures above 90 and below 20 degrees are rare. Prevailing winds are moderate northwesterly in summer and strong southwesterly in winter. Dry easterly winds of 2 to 3 days duration can occur at any time of year. Generally, one or two winter storms generate winds up to 80-100 miles per hour.

Summer weather is characterized by foggy mornings, warm, sunny afternoons and cool evenings. The northwesterly wind that usually blows every afternoon is quite cool. Fog or low overcast often lasts all day. Precipitation is light and spotty. Winter weather is characterized by frequent rains, with intermittent clearing periods. Snowfall is rare.

The beaches and open sand dunes are largely devoid of vegetation, but pioneering plant communities reach out even into these hostile environments. On the drier sand areas, the predominant species are American beach grass, kinnikinick, manzanita, and shorepine. On the wetter sand areas, the species are sedges, rushes, grasses, willow, waxmyrtle, and sitka spruce.

Vegetation

Along the eastern edge of the active dunes is a zone of confrontation between shifting sand and forest. Wind either deposits sand against trees, gradually burying them, or blows the sand away, leaving the trees undermined. In places, several acres of forest have been isolated by the advancing sand, leaving "tree islands" in a sea of sand. The easterly advance of the sand front varies with location, but generally averages 6 to 10 feet per year.

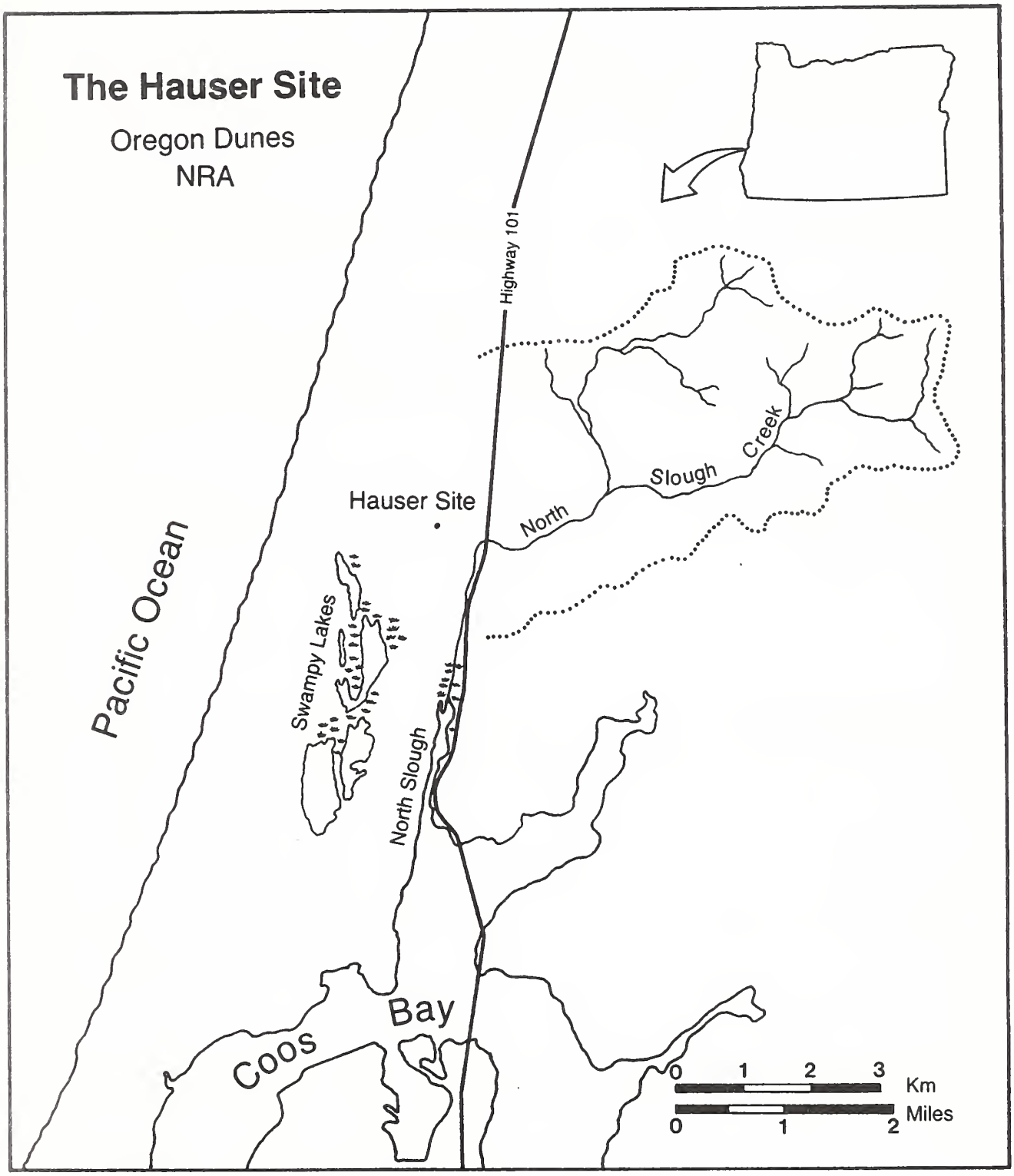

Fig. 1 The Hauser site location on the Oregon Dunes NRA. Dotted line outlines the drainage basin for North Slough Creek.

Further inland, where vegetation has been established for a longer time and the salt spray and wind from the ocean are less severe, the transition forest begins to cover both the dune surface and the foothills of the Coast Range. This plant community is a mixture of five tree species: Shorepine, Sitka Spruce, Western Hemlock, Western Red Cedar, and Douglas-fir. Understory species are Rhododendron, Salal, Evergreen Huckleberry, Trailing Blackberry, Salmonberry, Thimbleberry, Manzanita, Pacific Waxmyrtle, and Kinnikinick.

Wildlife and Fish

The central Oregon coast area is inhabited by a wide variety of wildlife and fish. Birds are the most numerous, including song birds, birds of prey, and migratory sandpipers and waterfowl. A large number of mammals inhabit the area, with the Columbian black-tailed deer being the most common.

The Siuslaw River, Siltcoos River, Tahkenitch Creek, Umpqua River and Tenmile Creek support anadromous fish, as well as other species. Estuaries and open beaches support a variety of shellfish, crustaceans, and saltwater fish.

Water

The sand dunes are an excellent aquifer. The sand absorbs a large percentage of the 70 inches average annual rainfall and stores it as fresh ground water. South of Tenmile Creek much of this discharges naturally into the ocean, Coos Bay, and North Slough through seeps and springs.

Geology

Although the geological history of the area is not yet fully understood, research shows that most of the area is related to Tertiary (60 million years ago) and Pleistocene (one million years ago) activities. During the late Pliocene and early Pleistocene, extreme submergence is evidenced by wave-cut terraces some 1500 feet above present sea level. Subsequent uplift lowered the shoreline about 300 feet below present sea level, and it was during this period that the rivers and streams cut their trenches across the Continental Shelf. Resubmergence to about 160 feet above present sea level occurred at the beginning of the Pleistocene sand dune activity.

Elevation changes since the late Pleistocene are due to cycles of glaciation, with the last major shoreline lowering (to 330 to 450 feet below present sea level) coinciding with the maximum of the last (Wisconsin Period) glaciation. As the glaciers melted, sea level rose rapidly, and the lower reaches of the deeply incised rivers were drowned, forming estuaries that ultimately reached the present coastline. Sand dune activity began again about 8000 BP and the sand moved inland ahead of the advancing sea, reaching its maximum development at the end of the period of submergence, about 6,000 years ago. In the period since maximum submergence, the sand dunes have undergone various cycles of stabilization and rejuvenation, depending upon vegetation, disturbance and shoreline processes. During the past 6,000 years, the shoreline has been in a state of relative stability, although the present dune field has been actively changing at the numerous estuaries along this stretch of coast. At present, the dunes in this area rest on the broad, low surface of a rock terrace which slopes gently below sea level and extends inland up to 2 1/2 miles.

Studies of estuaries on the Alsea River and Tahkenitch Lake indicate that they were initially established by approximately 7500-8000 BP. About 5000 BP a change in sedimentation and water salinity in the Alsea estuary indicates infilling of the drowned river valley, coupled with invasion of more marine water into the river-fed estuary. Sand spits formed at the mouths of major estuaries (Alsea, Tillamook Bay) approximately 2000 BP. For Tahkenitch Lake (a much smaller hydrologic regime) evidence indicates that dune buildup at approximately 3000 BP dammed the estuary

mouth, creating the freshwater lake and destroying the molluscan resources used by the prehistoric inhabitants of this area.

The Hauser site environment has probably been reasonably similar to today's for most of the Holocene (8000 BP-Present), except for the presence of an estuary on the drainage of North Slough Creek. Today, North Slough Creek heads four miles east of the Hauser Site and drains a basin of approximately 9 square miles (Fig. 1). The present outlet is into the North Slough of Coos Bay, approximately 1 mile southeast of the Hauser Site, but this is a direct result of the drainage being turned south by the coastal dune field. Prior to full formation of these dunes the estuary for North Slough Creek extended to (or close to) the present Hauser site location (Fig. 2). According to local residents, well drilling in the area immediately south of the Hauser site penetrated a thick layer of organic-rich estuarine sediments approximately 40-50 feet below the present surface (at the present sea level). These dark sediments contained numerous mollusc remains. Whether this estuary extended eastward from the coast or extended northward from Coos Bay along the present course of the lowermost reach of North Slough Creek is not yet known. In either case, the fauna within the Hauser Site indicate that until approximately 2600-3000 BP the Hauser site was located on an estuary.

Prehistory Overview

The last decade has seen a great increase in archaeological research and data synthesis for the central Oregon coast. Beginning about 1980 both Oregon State University and Heritage Research Associates began to publish a variety of reports on investigations in this area (e.g. Barner 1981; Bennett 1988; Clark 1988; Draper 1981; Minor 1986, 1989; Minor and Toepel 1986; Minor et al 1985, 1987) and Lyman and Ross (1988) synthesized much of the available material into a generalized chronology. Based on these reports and synthesis the following sketch of central Oregon prehistory can be developed.

The earliest inhabitants of the central Oregon coast appear to be groups of generalized foragers opportunistically exploiting land and sea mammals but not specializing in the collection of resources from the intertidal zone. The best evidence for this occupation is from the lower component at the Tahkenitch Lake site (Tahkenitch I) which dates to the period between 8000 and 5000 years ago. Lyman and Ross (1988) term this the Prelittoral Period.

Following the Prelittoral, people began to seasonally structure their subsistence activities toward exploiting more typical coastal resources. A variety of mussels, clams, and other shellfish, ducks and other shorebirds, and sea mammals including whales, seals, and sea lions formed the subsistence basis for these coastal inhabitants. Archaeological evidence indicates that people began to live in larger and more permanent villages toward the end of this period. Dates between 5000 and 2500 years ago place sites such as Umpqua/Eden, Tahkenitch component II, and Yaquina Head in this Early Littoral Period (Lyman and Ross 1988).

At the end of the Early Littoral a series of environmental changes occurred along the central Oregon coast. Dated between 2000 and 3000 years ago, these changes included the drowning of many estuaries by drifting sand dunes that today form the Oregon Dunes NRA. The estuary at Tahkenitch was changed into a freshwater lake. At Yaquina Head a shift in settlement away from the large village at 35LNC62 appears also to be related to changing environmental conditions at this time. Following these changes at approximately 2000 years ago, coastal Indians continued their littoral adaptation, but began congregating in larger, more permanent villages. Some of these took on the status of permanent towns. Sites such as Cape Perpetua, Seal Rock, Neptune, and North Yaquina indicate a heavy reliance on locally available shellfish, fish, and sea mammals. The inhabitants of these sites were the ancestors of the ethnographically known Yaquina, Alsea, Siuslaw, Siletz, Lower Umpqua, and Coos Indians.

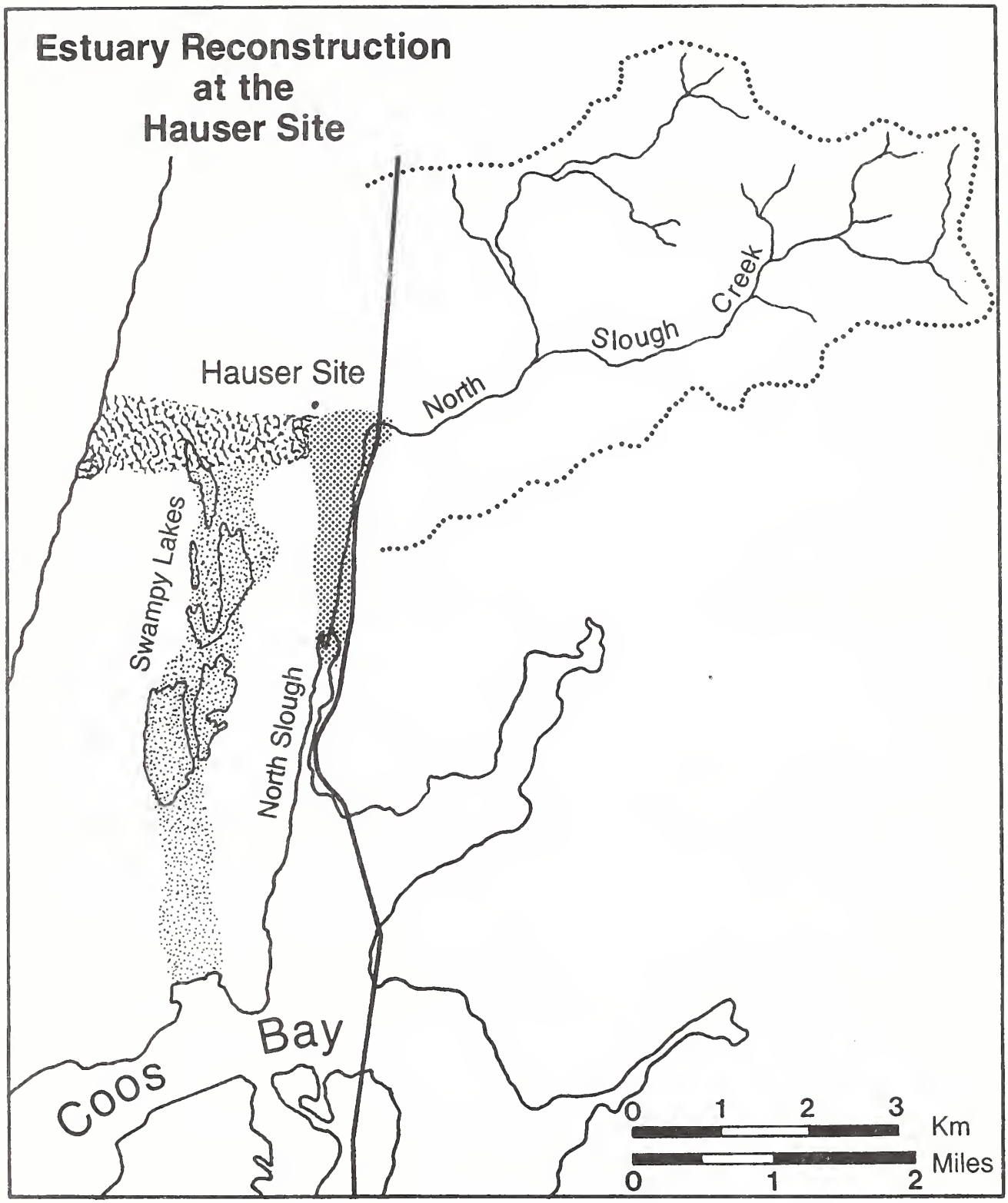

Fig. 2 Reconstruction of possible estuaries in the Hauser site vicinity during the period of site occupation.

FIELD INVESTIGATION

When test excavation began, the Hauser site was a small midden area of dark, charcoal-stained soil and shellfish remains eroding from the cutbank on the west side of the unimproved access road through the ODNRA. The dark soil stain extended intermittently for approximately 50 meters north along the ORV road. Shellfish deposits were observed eroding from the roadside cutbank near the south end of the site, and shell fragments were scattered throughout the stained area in very small quantities. At the approximate north end of the stained area, placement of a roadside barrier post had resulted in the unearthing of a small quantity of shellfish remains.

Due to time constraints our test excavation effort consisted of digging a small excavation unit in the area of highest surface artifact density and heaviest impact. This was located near the southern boundary of the site (Fig. 3). In addition we dug a series of 27 auger probes (Table 1) in a north-south grid the length and breadth of the site to verify the presence of subsurface shell and better delineate the site boundary. Investigations began by laying out a one meter square unit at the cutbank along the west side of the road. Here a 20 cm thick lens of shell and charcoal could be seen almost at the level of the road surface. Excavation consisted of facing up the sloping cutbank and shovel skimming the sand deposit in 10 cm levels. At approximately 40 cm below surface, slight differences in sand color and texture led us to suspect that there was stratigraphic differentiation of the matrix within which the midden was deposited, and it appeared that these strata sloped downward from west to east (from the rear to the front of the excavation unit). Because of the time constraints and the restricted work area along the road, we opted to continue excavation in arbitrary levels, but to carefully note stratigraphic differences when encountered. At the level of the road bed, 80 cm below surface, a second excavation unit was placed to the east of the first. Below 80 cm only the west half of this second unit and the east half of the original unit were excavated.

Matrix from the site was dry screened through 1/4 inch (6 mm) mesh hardware cloth to recover artifacts and faunal materials. All bone fragments, shellfish fragments showing hinges or any other diagnostic attributes, fire fractured rock, and large charcoal chunks were collected from the screened matrix. Each of these artifact classes was bagged as a separate field specimen for each 10 cm level. Following excavation of the unit to 1 meter depth we probed 40 cm deeper with a small soil auger (1 inch diameter barrel) to ascertain the presence of shell lower in the deposit. Finally, we mapped the stratigraphic profile of the south wall of the excavation unit and then backfilled the hole.

Additional auger probing was conducted on August 21 and September 10, 1990 using a 2.5 inch diameter barrel auger with a 6 foot extension handle. During these days we excavated 27 auger probes in a roughly north-south grid (Fig. 3) to establish horizontal and vertical site extent. All cultural matrix was screened and collected in the same manner as the excavation unit.

Stratigraphy

In the area of our excavation unit, the Hauser site shows a moderately complex stratigraphic profile (Fig. 4), complicated by factors typical of many coastal shell middens. The major factors include the lensatic nature of the cultural deposit and the sloping dune face on which the deposit was originally laid down. In our excavation we differentiated five distinct strata, one of which has three different aspects apparently due to varying quantities of organic content.

The uppermost stratum, extending from ground surface to 30-45 cm below surface, is an unconsolidated, light yellow-grey sand, heavily rootbound in the 15 cm of deposit immediately below surface. Neither faunal materials nor charcoal were recovered from this stratum, indicating that it is culturally sterile in this area.

TABLE 1

Description of Auger Probe Results

Probe No.	Cultural Component Depth Below Surface	Artifact Description
1	20-132cm	discolored sand/charcoal, dense clam/mussel, bird, fish, large mammal
2	70-86cm	discolored sand/charcoal, dense clam/mussel, bird, fish, cockle
3	80-102cm	discolored sand/charcoal
4	63-122cm	discolored sand/charcoal, dense clam/mussel, bird, fish, triton
5	127-132+cm *	discolored sand/charcoal, dense clam/mussel, bird, fish
6	20-132cm	discolored sand/charcoal, dense clam/mussel, cockle, fish
7	20-122cm	discolored sand/charcoal, dense clam/mussel, bird, crab
8	91-132+cm	discolored sand/charcoal, dense clam/mussel; oyster, bird, fish
9	102-132+cm	discolored sand/charcoal
10	91-132+cm	discolored sand/charcoal
11	60-130cm	discolored sand/charcoal
12		dispersed shell on surface
13		Sterile
14	114-132cm	discolored sand/charcoal, dense clam/mussel, fish
15	40-50cm	discolored sand/charcoal
16	0-30cm	discolored sand/charcoal
17	30-42cm	discolored sand/charcoal, dense clam/mussel
18	122-132+cm	discolored sand/charcoal
19	140-280+cm	discolored sand/charcoal, dense clam/mussel, cockle, crab, pine needles
20		90-170cm Thin lenses of discolored sand/charcoal
21		Sterile
22		Sterile
23		Sterile
24		Sterile
25	130-210cm	discolored sand/charcoal, dense clam/mussel
26	65-90cm	discolored sand/charcoal, lenses of clam/mussel
27	50-95cm	discolored sand/charcoal, lenses of clam/mussel

* A + symbol indicates that when the maximum auger depth was reached there was still cultural material present

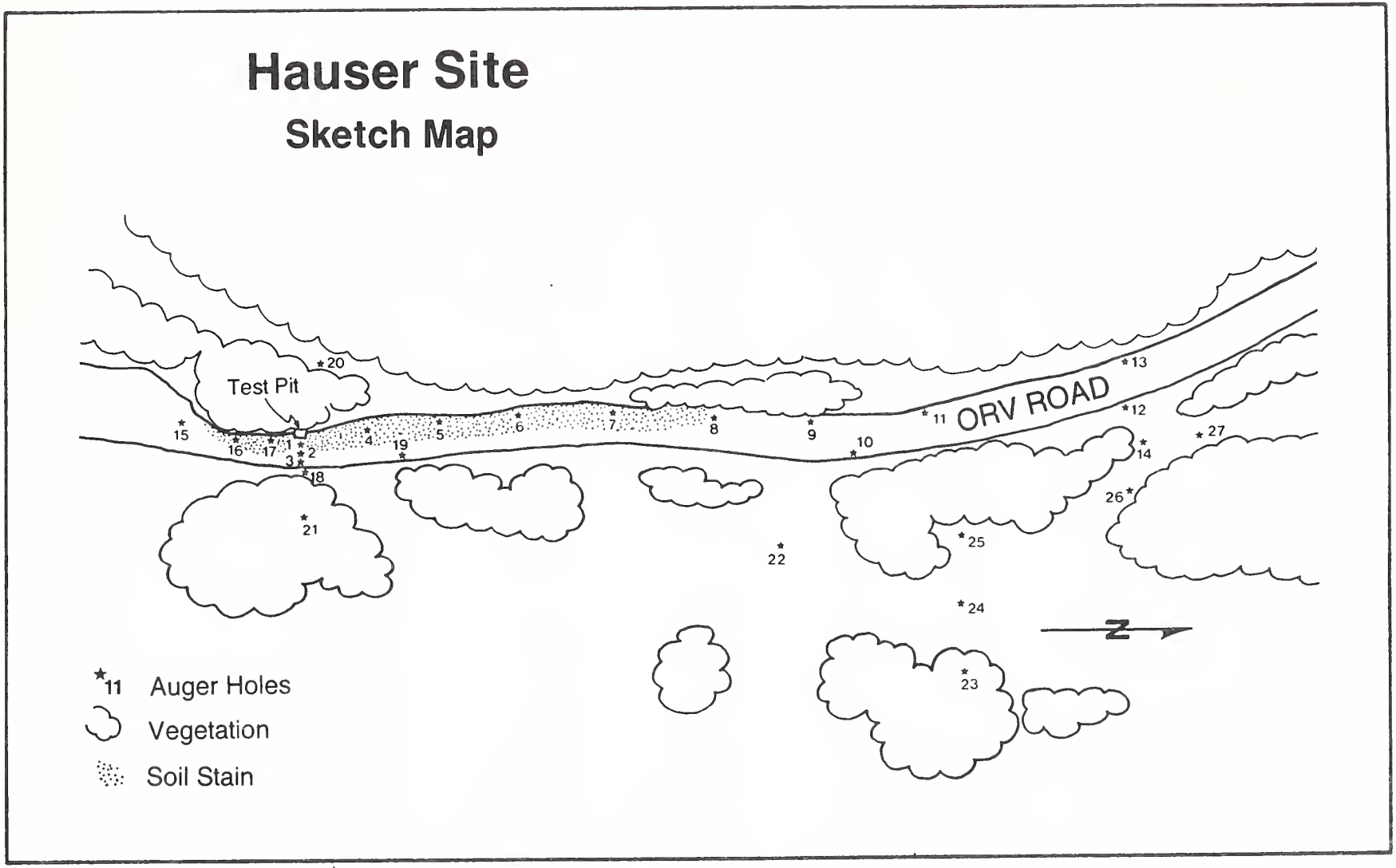

Fig. 3 Hauser site sketch map. Location of test pit near south edge of site, auger probes identified by numbered stars.

Stratum 2 is a dark grey sand ranging in thickness from 10 to 20 cm with the thickest portion at the cutbank along the east edge of the excavation unit. Stratum 2 contains large amounts of shell fragments and charcoal and a small lens of tan sand that may be of cultural origin. Charcoal is scattered throughout the stratum, but shells are primarily restricted to the thicker, easternmost portion at the face of the cutbank. In this area we noted one 12 cm thick shell lens composed of numerous large clam shells and minor amounts of finely crushed mussel shell. Charcoal ranged from flecks to fragments more than 2 cm in diameter.

Stratum 3 is a thick yellow-tan to grey-tan sand that shows three different aspects due to differing quantities of organic materials. The stratum ranges from 15 to 32 cm thick (but based on the exposed profile it may be considerably thicker as it extends to the east). The three aspects of this stratum, labelled a-c, are most clearly differentiated in excavation unit 2 and the eastern portion of excavation unit 1. In the western portion of unit 1 these aspects cannot be readily separated in profile and were not visible during shovel skimming. Stratum 3a is the uppermost part of this stratum, tan in color and not particularly rich in artifacts or charcoal. Below 3a and separated from it by an extensive lens of charcoal and shell is stratum 3b, a mottled dark yellow-brown sand with large quantities of clam and mussel shell. Below 3b is stratum 3c a light grey-yellow sand discolored by moderate amounts of charcoal and mussel and clam shell.

Stratum 4 is a grey brown sand discolored with moderate amounts of charcoal and finely crushed mussel shell. It ranges from 10 to 16 cm in thickness, but in contrast to the other strata appears thicker in the western portion of the excavation unit. The heaviest shell concentration in this unit was located in its lowest portion at the boundary between excavation units 1 and 2.

Stratum 5, exposed only in the lowest, western portion of excavation unit 1, is a light yellow sand that was nearly culturally sterile in the area excavated. No charcoal or shell was noted in the two small areas of stratum 5 that were excavated, but the depth to which mussel shell fragments were recovered in the auger probe suggests that in the area of excavation unit 2 stratum 5 may contain some shell.

In general, the strata in this portion of the Hauser site slope steeply from west to east. The steepest slope (nearly 45%) is noted along the top of stratum 4, but the top of stratum 3 has a nearly 30% slope and even stratum 2 shows an 18% slope. The greatest quantity of shell is found in lenses at the lowest observable parts of these sloping surfaces, suggesting that the shell was deposited down a sloping dune face or in a wind-sculpted hollow in a dune.

Auger probing verified the observation that the cultural deposits at the Hauser site were situated on an east-sloping surface. Deposits along the eastern side of the road are generally buried more deeply than those along the west side, and some of those deposits extend deeper than three meters below the surface. Obviously, further excavation is necessary to determine the subsurface geomorphology of this site, but with the exception of different quantities of organic debris, the sand matrix appears to be very similar throughout.

Collection Methods

Collection of shell samples from the Hauser Site test excavation was by the "grab sample" method in order to ensure that any potentially identifiable molluscan, crustacean, mammalian, and avian species present in the midden were recovered for analysis. Given the small size of the excavation and the time constraints on the project, no column samples were collected. While this means that we cannot do strict comparisons of relative abundance of various species, our collection method does enable us to be confident that all recognizable shellfish and crustacean species were identified. Shell and bone identification and analysis were done by Howard Gard and Dominique LeFievre, Anthropology graduate students at Oregon State University.

ARTIFACTS

Artifacts recovered from the Hauser site consisted of shell, bone, charcoal, and fire fractured stone. The only possible tool recovered was a clam shell showing an apparently cut hole. Each of these artifact classes is described and analyzed below.

Faunal Remains

Fauna from the Hauser site includes shellfish, crustacean, and vertebrate remains. Shellfish are the most frequently recovered, but significant numbers of avian and fish bones were obtained from such a limited excavation.

Shellfish

Shellfish remains are the primary constituent of the Hauser site midden. Visual examination of the site surface deposit and the screened midden contents showed the presence of large quantities of clam and mussel shells, and occasional barnacles, snails, and crab shells. Often these items were congregated in dense midden lenses, at least three of which were encountered in our excavation. In other places the shells (especially the mussels) were dispersed throughout the sandy matrix without a definable lens or midden.

Although seven different species of marine molluscs were identified in the sample collected from the Hauser site, more than 80% of the remains consisted of three species: Gaper Clam, Bay Mussel, and Bent-nosed Clam (Table 2). Although Acorn Barnacles occur throughout the midden, they were often attached to a larger clam shell. Along with their small size, the fact that they appear in the site primarily as "hitch-hikers" on larger molluscs indicates that they probably did not represent an intentionally sought after food source at this site. This is consistent with evidence from other sites in the area (Barner 1986), and thus, the barnacles are not utilized in any further analyses.

Although calculation of relative abundance of molluscan species cannot be done to the extent and reliability possible with a column sample, our grab sample does provide some intriguing clues as to the makeup of the Hauser site midden. Molluscan remains were found only below 50 cm below surface. Segregating these specimens into sloping strata that crosscut arbitrary excavation levels is difficult but it can be done to provide a relatively crude indication of the frequency of utilization of various species (Table 3).

Between 50 and 70 cm below surface identifiable clam shells outnumbered mussel shells 51 to 1. This area is primarily the midden deposit in stratum 2 and part of stratum 3a. The 70-80 cm level and the 80-90 and 90-100 cm levels in excavation unit 2 compose primarily the upper portion of stratum 3 (strata 3a and 3b). In these levels clam shells outnumber mussels in a ratio slightly greater than 5:1. In excavation unit 1, between 80 and 100 cm below surface we exposed the shell deposits in the bottom of stratum 3 (stratum 3c) and stratum 4. In these levels mussel shells were relatively more abundant, having a ratio only slightly less than 1:1. This greater abundance of mussel shell at deeper depths is supported by an auger probe below the excavation unit floor which recovered only mussel shell. In other areas of the site, however, auger probes revealed that the deeper portions of the midden had significant quantities of clam and cockle shells.

In summary, the shell data indicate that the inhabitants of the Hauser site regularly utilized gaper clams, littleneck clams, bent-nosed clams, basket cockles, and bay mussels. These molluscs are characteristically found in protected estuarine environments with rocky outcrops and mud to gravelly sand substrata. Likely, the rocky shelf that underlies this area of the ODNRA (USDA 1977) was exposed in the estuary during the time of aboriginal occupation. All of these species could have been collected throughout the year during periods of low tide. Although both mussels and bay clams were exploited at this site, the data from the excavation unit suggest that in stratum 2

and the upper portion of stratum 3 the various clam species were a significantly more important food resource at the site (Table 3). Whether this represents a preference for certain species or differential availability is not yet known.

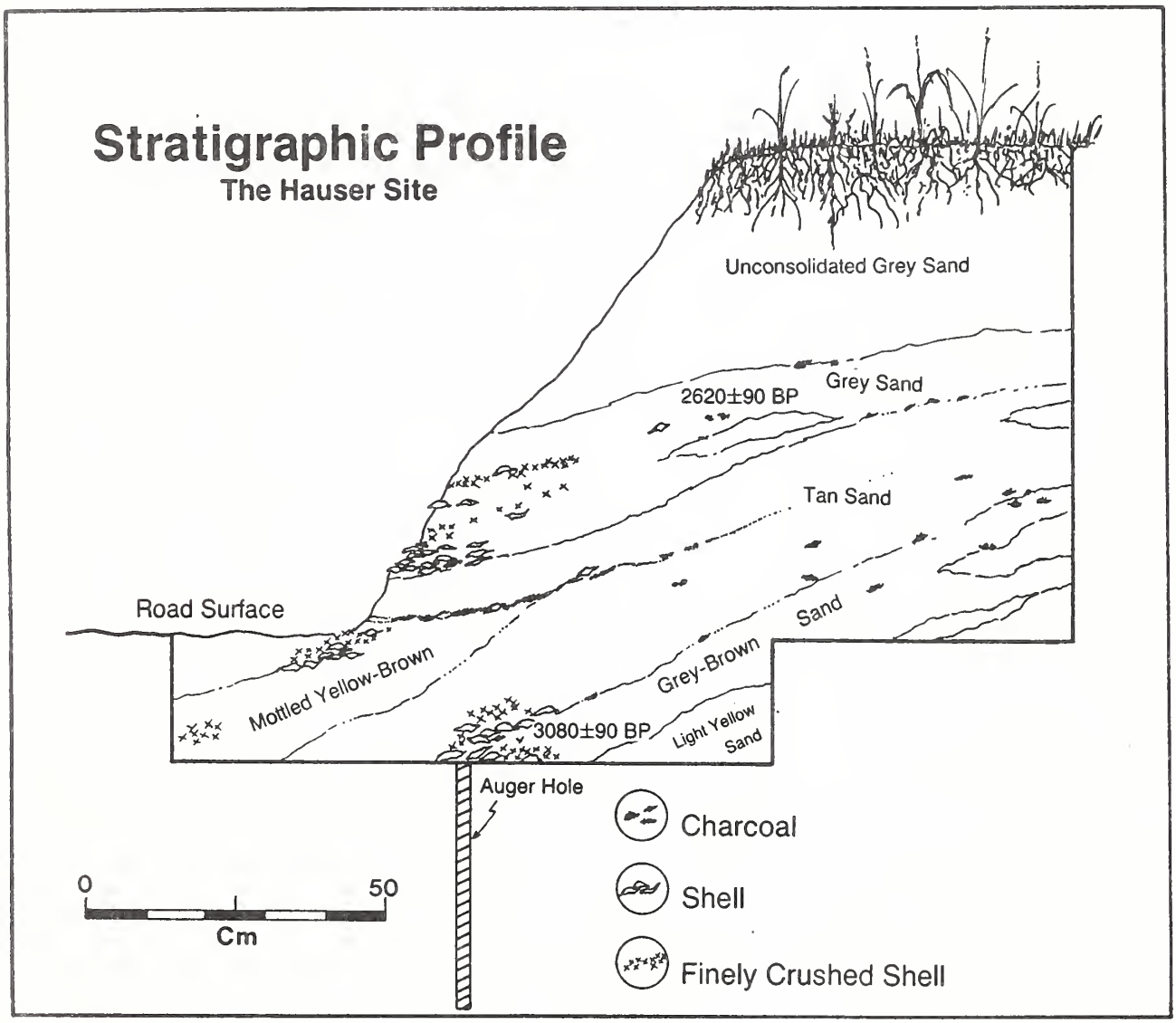

Fig. 4 Stratigraphic profile of the test pit at the Hauser site.

TABLE 2

Faunal Species Composition, Hauser Site Midden

	30-40	*40-50*	*50-60*	*60-70*	*70-80*	80-90 *Unit 1*	80-90 *Unit 2*	90-100 *Unit 1*	90-100 *Unit 2*	*Total*
Shellfish										
Bentnosed Clam				1	7	1	22	5	6	42
Gaper Clam			11	32	37	1	26	2	12	121
Bay Mussel				1	11	13	10	6	7	48
Basket Cockle				1	2		1		1	5
Native Oyster						2			9	11
Littleneck Clam			1	3	5		1			10
Barnacle			1	1	3	7	10	7	10	39
Fish/Crustacean										
Salmon			1	1	2				1	5
Perch							1		1	2
Flounder			1	1	1			1	1	5
Sculpin					1	1	1			3
Fish #1			1	1	1		1			4
Fish Unidentified					1					1
Crab				1	7		1		4	13
Mammal										
Sea Mammal		1								1
Large Mammal				1						1
Medium Mammal	1			1	1					3
Mustilid							1			1
Bird										
Large Bird (Duck, Gull)					1				1	2
Scoter				1						1
Phallarope				1						1

TABLE 3

Ratio of Clams to Mussels by Stratum

	Clam	Mussel	Ratio
Stratum 2	51	1	51:1
Stratum 3a	152	28	5.5:1
Strata 3b/4	25	19	1.3:1

Crustaceans

A total of 13 crab carapace fragments were recovered from the test excavation. This is *Cancer* sp., but the extremely small fragments could not be identified any more specifically with certainty. Crab shells were the only faunal material consistently showing effects of heating or burning. Certainly these crustaceans were used as food. Their relatively low frequency is either due to the fact that unburned crab shell disintegrates rapidly, or alternatively, they may have been only a minor food source.

Vertebrate Fauna

In addition to the shellfish found in the Hauser site, a small sample of vertebrate faunal remains was recovered. These included six species of fish, four species of mammal, and three bird species (Table 2). Most of these bones were recovered as a constituent of the lenses of shell within the site, and they were collected as a grab sample in the same manner as the molluscan remains.

All six species of fish were recovered in approximately equal, small quantities, except for a single unidentified specimen. These fishes include Salmonids, Sculpin, Flounder, Perch, and two unidentified species represented by four specimens and a single specimen. All four of the identified fish species occur commonly in estuaries along the Oregon coast. Perch typically form loose schools and can be easily caught with nets or herded into stone wiers. Sculpin and Flounder are most easily caught with baited hook (ethnographic records indicate that shiner perch were sometimes used for bait). Salmonids are usually fished during their seasonal spawning runs using dip nets, spears, or basket wiers. All of these species are likely to have frequented an estuarine habitat identical to that indicated by the shellfish remains.

The mammals include a single specifically unidentified sea mammal bone fragment (identified by the high porosity of the calcareous tissue), bones from large (elk or deer) and medium to small land mammals (dog size or smaller), and one fragment of a mustelid (mink or weasel). All of these species would have been found in or adjacent to an estuarine environment.

Birds include one scoter, two large duck or gull sized specimens, and three elements from a phalarope or sandpiper. All of these birds inhabit estuarine environments during some parts of the year.

Fire Fractured Stone

Two fragments of fire fractured stone were recovered from the excavation, one from the 60-70 cm below surface level and the other from the 80-90 cm below surface level in excavation unit 2. The fragment from the 60-70 cm level is a small, angular chunk of sedimentary, non-calcareous river cobble, heavily fire blackened and stained with charcoal. This is a typical fragment from a stone intentionally heated in a hot fire. The second fragment, recovered from deeper in the site in an area of reasonably dense shell concentration in stratum 3b, is an irregularly tabular chunk of friable local sandstone roughly broken on two sides and showing a dark reddish discoloration on the dorsal surface. This stone appears to have been accidentally heated in a relatively cool fire.

Both of these stones appear to have been culturally modified by fire, probably as part of cooking or heating fires.

Possible Tool

One large Gaper clam shell may be a tool. The shell, measuring 10.5 cm across, is the largest recovered at the site. It is unbroken except for a centrally located, roughly oval hole measuring 2.4 x 2 cm. A post-depositional crack extends from near the hinge to this hole. The hole edges inslope gently from the exterior surface, and one side is formed by a nearly straight line 1.8 cm long. This shell was found *in situ* with the dorsal surface up. Examination by hand lens shows no obvious abrading, striations, or incisions around the margin of the hole, but it does not appear to have been formed by natural causes. Breakage would not likely occur along a straight line cross cutting the growth rings of the shell, nor would it form the gently insloping sides of the hole. Predatory shellfish generally leave smaller, more regular holes (as noted on other specimens in the clam shell sample from the site). No wear is apparent on any margin of the shell. If this is a tool, the function is not obvious.

Charcoal

Eight charred wood samples were recovered from the Hauser site during reconnaissance work (Table 4). The charcoal in all samples was in a rather poor state of preservation. The charcoal was very friable. Most sectioned fragments revealed extensive disintegration of the cell walls. During preparation for microscopic examination, many charcoal pieces exfoliated along growth rings. All of the charcoal examined contained modern fungal hyphae and plant roots. The poor condition of the charcoal may be the result of repeated wet/dry episodes, periodic submersion in saltwater, or the activities of fungi, plants, and other organisms.

One to three charcoal fragments per sample were identified to the generic- or species-level. Due to the extremely fragile condition of the charcoal, no fragments were identified in sample #2. No attempt was made to identify a representative subsample from each charcoal sample. Fragments were selected from a sample if they seemed to be readily identifiable. Transverse, tangential, and radial sections were obtained from such fragments, and they were examined using a 100X dissecting microscope. Pine (presumably *Pinus contorta*) was found in all samples. Douglas-fir (*Pseudotsuga menziesii*) was found in two samples (Table 4). No hardwood species were identified, although this may be a function of inadequate sampling.

The only conclusion that can be validly drawn from this analysis is that the charred wood of shorepine and Douglas-fir was present in the upper layers of the Hauser site. The presence of these two species neither contradicts nor adds to paleoenvironmental reconstructions for the region. Did shorepine and Douglas-fir grow naturally at the Hauser site? Did people bring the wood of these species to the site from afar? Was this wood used as fuel, as a building material, or both? Were other tree species present at the Hauser site? Answers to these questions must await a more extensive charcoal analysis.

RADIOCARBON DATING

Two radiocarbon dates were obtained from charcoal samples recovered from the Hauser site (Table 5). Both samples consisted of large flecks and chunks of charcoal (ranging from approximately 3 mm to 2 cm in size) that were collected from the screening process. In both samples this charcoal was a loose constituent of the midden deposit rather than charcoal recovered from a discrete feature. Because of the nature of the sloping strata and the test excavation of the site in arbitrary 10 cm levels there is some likelihood that the charcoal samples collected during testing contain material from different strata. To reduce the impact of this on our dates, we selected two samples that appeared to have the least probability of being mixed between levels.

The first was taken from the 40-50 cm level. Approximately 50% of this level was composed of stratum 2, and the remainder was the latest part of stratum 3 (stratum 3a) which had the lowest charcoal content of any part of stratum 3 (as evidenced by the yellow-tan coloring and the lack of visible charcoal flecks in the profile). The date from this level is 2620 +/- 90 years BP.

The second sample, taken from the 90-100 cm level in excavation unit 1, was selected to date the lowest exposed part of the site. This area included the lowest portion of stratum 3 (stratum 3c) and strata 4 and 5 (Fig. 4). A dense lens of shellfish remains occurred at the east edge of the unit along the contact between strata 3c and 4. Stratum 5 was culturally sterile and devoid of charcoal in this area. The date from this level is 3080 +/- 90 BP.

TABLE 4

Hauser Site Charcoal Identification

Depth	Taxa Identified
30-40 cm	No identifiable charcoal
50-60 cm	Pine (*Pinus contorta*) Douglas-fir (*Pseudotsuga menziesii*) (2 fragments)
60-70 cm	Pine (*Pinus contorta*) Douglas-fir (*Pseudotsuga menziesii*)
70-80 cm	Pine (*Pinus contorta*)
80-90 cm	Pine (*Pinus contorta*)
90-100 cm	Pine (*Pinus contorta*)

Despite the potential for mixing between levels, both of these dates appear to be valid for assessing the age of the Hauser site midden. The upper date provides a reasonably good estimate for the terminal use of the site, and fits quite well with the Tahkenitch Landing site (21 miles/34 km to the north) dates that document the final drowning of the estuaries on this stretch of the coast caused by the establishment of the large dune fields we see today. The lower date provides an approximate age for the transition between strata 3c and 4 and appears to date the time of transition between a reliance on approximately equal proportions of bay mussels and clams to one marked by much heavier reliance on various clam species.

DISCUSSION AND CONCLUSIONS

The Hauser site is an estuarine shell midden currently located in an active dune field on the central Oregon Coast. Situated in a US Forest Service right-of-way across private land, the site is exposed in an ORV access road to the ODNRA. It is evidenced by a soil stain and scattered lenses of shell and charcoal in the roadside cutbank. Test excavation and a pattern of auger probing reveals that the site underlays the entire road and extends a few meters to the east of its present location.

Today the Hauser site is an environmental anomaly in that the nearest estuary (North Slough) is more than a mile south of the site, and good shellfish collecting habitat is even further south. Water wells drilled near the site, however, indicate estuarine sediments underlying the dunes in this area and coupled with archaeological data from the site this indicates that the location was the former estuary for North Slough Creek some 2500-3000 years ago.

TABLE 5

Radiocarbon Dating

Specimen No.	Provenience	Date BP	Sample type
Beta-35551	40-50cm BS	2,620 +/- 90	Charcoal
Beta-35552	90-100cm BS	3,080 +/- 90	Charcoal

Test excavation at the Hauser site yielded two radiocarbon dates approximately 450 years apart. A date from the topmost cultural deposit is 2620+/-90 BP and the other from deeper in the shell midden is 3080+/-90 BP. It is not known whether older material underlies the earlier date (although this is suggested by evidence from some auger probes) but the more recent date appears to provide an accurate date for site abandonment since no cultural material was found above it in the stratigraphic profile.

The age of the Hauser site and the corresponding indication of paleoenvironmental change caused by the drowning of the North Slough Creek estuary by the migrating dunes is consistent with evidence from the excavations at the Tahkenitch Landing site. There, archaeological investigations in 1984 showed that changing environmental conditions drowned the Tahkenitch estuary and created Tahkenitch Lake at about 3000 years before present (Minor and Toepel 1986). Prior to that, the Tahkenitch Landing site had been the setting of an estuarine village for some 2000 years (5200-3000 BP). The terminal date of 2620 BP for the Hauser site fits very well with the date of 3000 BP for the termination of shellfish exploitation at Tahkenitch, and as such, provides additional evidence that this area of the central Oregon coast underwent a period of dune expansion between 2500 and 3000 years ago.

Molluscan remains from 35CS114 are the strongest indicator of paleoenvironmental change at the Hauser site. Composition of the shell midden includes seven species: Bentnosed, Gaper, and Littleneck clams, Basket Cockle, Native Oyster, Bay Mussel, and Barnacle. According to Barner (1986:52-56; and in Minor et al 1985:57-61) shellfish habitat is determined by three primary variables: wave shock, substratum, and tide level. Wave shock is an indicator of whether the habitat is open (headlands, outer coast) or protected (bays, estuaries). Substratum delineates the attaching surface or burrowing matrix and ranges from solid rock through gravel to fine sand and mud. The tidal zone refers to the length of exposure between tides when shellfish can be collected. Tidal zones follow the definitions of Flora and Fairbanks (1977:vi):

Zone I - above average spring high tide
Zone II - from average neap high tide level up to average spring high tide
Zone III - from average neap low tide level to average neap high tide level
Zone IV - from average spring low tide level up to average neap low tide
Zone V - below average spring low tide line

A neap or equatorial tide is defined as that part of the lunar cycle with the least ranges of highs and lows, associated with the quarters of the moon. The spring tide is "the tide cycle of the greatest range, that is with the highest high and the lowest low, associated with the full and new moons or the period of maximum declination" (Ricketts and Calvin 1968:571).

In areas of mixed tides such as the Pacific Coast, zonal divisions are quite discrete. Zone V can only be examined and exploited a few hours each month. At the other extreme, zones I and II are easily accessible except during very high tides. Thus, the tide would have affected both the quantity

and the type of shellfish which could have been procured by the native inhabitants of the Hauser site at various times of the year (Table 6).

Gaper, littleneck, and bent-nosed clams and cockles inhabit zones III and IV in protected estuarine waters with a mud to gravelly sand substratum. They could have been collected throughout the year at low tides. Bay mussel inhabits zone III in estuaries and can be found attached to rocks and wood. These mussels grow in dense beds that make it possible to collect clusters rather than single individuals. Native Pacific Oysters grow on rocks near low tide or in beds on estuarine mud flats or gravel beds. All of these species found in the site could have been collected with relative ease by the inhabitants of the Hauser site.

A few Acorn barnacles were found. These barnacles grow in similar environments as the other molluscs and they were probably brought to the site as "hitchhikers."

Nearly all of the other faunal remains from the Hauser site test excavation also indicate an estuary environment (Gard and LeFievre 1989). Crab, perch, salmon, flounder, sculpin, duck, gull, scoter, phalarope/sandpiper, and mink/weasel are all found in protected estuarine environments. Their occurrence in the Hauser site midden indicates that the site inhabitants were foraging in the estuarine environment for a variety of resources in addition to the shellfish that compose the majority of the midden deposit. Deer and Elk inhabit the transition zone between dense forest and open estuary environments.

Given the archaeological evidence that the Hauser site was situated on an estuary 3000 years ago, it is apparent that there has been a significant change in the drainage of North Slough Creek since that time. This stream heads about 4.5 miles east of the site and flows almost directly west to the present location of highway 101. At this point, the stream now turns 90 degrees to the south and drains into the North Slough of Coos Bay. Today the upper two mile stretch of North Slough is not suitable mollusc habitat. Thus, the nearest clam and mussel habitat is almost three miles distant from the Hauser site.

The diversion of North Slough Creek at Highway 101 is due to the buildup of sand dunes along the coastal plain. Evidence from the Hauser site indicates that the estuary of North Slough Creek originally extended almost one-half mile west and one and one-half miles north of its present location along Highway 101 (Fig. 1). Wells drilled near the site area reveal a stratum of organic-rich estuarine sediments at present sea level (40-50 feet below surface) that contains numerous clam shells (John Goold, personal communication 1990). The configuration of the prehistoric North Slough Creek estuary is not known, but there seem to be three likely alternatives (Fig. 2). One would occur if North Slough Creek drained generally westward or northwestward past the Hauser site to the Pacific Ocean. A second possibility is that North Slough Creek drained further west and then southward through Sandpoint, Spirit, and Horsfall lakes into Jordan Cove. A third alternative is that the present North Slough extended further north and northwest to the site area. In any case, we know from the Hauser site data that 3000 years ago this area was an estuary environment rich in clams, mussels, fish, and associated mammals and birds.

INTERPRETATIONS

The Hauser site appears to represent a coastal village occupation dating between 2500 and 3000 years ago, and quite possibly even earlier based on the depth of deposits in the as yet uninvestigated portions of the site. Our rationale for classifying the Hauser site as a village is severalfold. Initially, the site is quite large--more than 70 meters north to south--and it contains a very high density of midden material over much of this area. The east-sloping stratigraphy in the site suggests that the midden area was deposited down the face of a stabilized dune. If so, the living area may have been slightly to the west, atop the dune feature. A similar situation apparently occurs at Tahkenitch Landing.

TABLE 6

Habitat for Species Recovered at the Hauser Site

MOLLUSCS and CRUSTACEANS

Bentnose Clam (Macoma nasuta) Zones III-IV
Habitat: Protected waters, heavy mud or muddy sand, can stand stale water, often found in lagoons with occasional influxes of sea water.

Bay Mussels (Mytilus edulis) Zone III
Habitat: Protected waters, dense beds, attached to rocks or gravels

Native Oyster (Ostrea lurida) Zone III
Habitat: Beds on surface of mud flats and gravel bars near mouth of rivers, tide pools, under rocks

Littleneck Clam (Protothaca stiminea) Zones III-IV
Habitat: Protected waters; gravel/mud, coarse sandy mud

Gaper Clam (Tresus nuttallii) Zone IV
Habitat: Protected waters, fine sand or firm sandy mud

Acorn Barnacle (Balanus glandulus) Zone II-IV
Habitat: Variable, abundant on rocks, occasionally in brackish water

Basket Cockle (Clinocardium nutallii) Zone IV
Habitat: Protected water, substrate of sand or mud or mixture of the two, low intertidal to deep water, eelgrass flats

Crab (Cancer magister) Zone V
Habitat: Common in Oregon in shallow water in summer when it comes in to moult.

FISH

Salmon (Oncorhynchus sp.)
Habitat: Anadromous, ocean and coastal streams

Perch (Embiotocidea sp.)
Habitat: Mostly in surf of sandy beaches, rocky shores, often around kelp

Flounder (Pleuronectidae sp.)
Habitat: Mud or sand bottom, common in shallow water

Sculpin (Leptocottus sp.)
Habitat: Common near shore, especially in bays and estuaries; sometimes inter coastal streams, most frequently found on sand bottom.

BIRDS

Scoter (Melanitta sp.)
Habitat: Tundra and boreal woodland interspersed with lakes or rivers; in winter, along seacoasts and in inshore waters.

Phalarope (Phalaropus sp) or Sandpiper (Scolopacidae)
Habitat: Bays and Estuaries; Offshore waters

MAMMALS

Mink or Weasel (Mustela sp)
Habitat: Riverine ecosystems, estuaries and bays.

The density of material (a deposit of shells more than 1.5 m thick in some parts of the midden), coupled with the variety of molluscan and faunal remains also suggests a village. Utilizing the dichotomy between temporary procurement camps and villages (Minor et al 1985:99) that has been used to classify other coastal sites, the Hauser site midden appears to be more complex than a resource procurement camp. Although variety of artifact types and species remains is apparently more a result of extent of excavation than of site function (Lyman and Ross 1988), the variety from a very limited test excavation at the Hauser site is likely to expand significantly following full excavation. Based on the testing alone the site appears to be more than a seasonal hunting camp, after excavation it will likely show even more complexity. The site location, on a sheltered estuary, is also more indicative of a village site. During the summer groups tended to live in open locations along the beach and at the mouths of estuaries. In winter, to take advantage of the most protected locations possible, villages were established near the heads of estuaries where the stream issues from the hills. The lack of housepits and paucity of artifacts at Hauser seems more likely due to sampling error than actual scarcity of these materials.

If this was, in fact, the site of a village, the evidence suggests an intensive seasonal occupation by a small to medium-sized group of coastal dwellers. Exploitation of estuarine resources and hunting of land mammals were the primary activities at the site, but evidence of other activities certainly awaits further investigation. Season of occupation at the Hauser site is not yet known, but a larger excavation will likely yield samples of sufficient size to provide additional information on seasonality of site use and economic importance of various resources.

The similarity of the Hauser site in age, probable function, and setting to component II at the Tahkenitch Landing site (Minor and Toepel 1986:105-106) suggests some avenues for future research in this area of the central Oregon coast. Prior to the excavation of Tahkenitch Landing, the oldest radiocarbon dated shell midden site on the Oregon coast was the Umpqua-Eden village located in the Umpqua river estuary. This site dates to 2960 BP (Minor et al 1985:101). Based on Umpqua-Eden, Component II at Tahkenitch Landing, and a few other sites from the time period between 2000 and 5000 BP, Lyman and Ross (1988) postulate a continuum from an Early Littoral to a Late Littoral stage on the Oregon coast. In their view, the shift to the Late Littoral stage took place over approximately 1000 years and was the result of increasing populations causing intensification of marine resource exploitation, increased sedentism, and more highly developed territoriality along the Oregon coast (Lyman and Ross 1988:100). In their view a gradual increase in cultural complexity characterizes this transition.

Data from Tahkenitch Landing and the Hauser site suggest that the transition may not have been as gradual as previously thought. At Tahkenitch Landing, drowning of the estuary caused an abrupt change in resource exploitation and an almost immediate abandonment of the village site and shift to use of the area as a fishing camp (Minor and Toepel 1986:106-107). The Hauser data suggest that the site was abandoned about the same time, when the estuary was drowned and the villagers could no longer collect bay molluscs. Given the fact that several other streams in the area now occupied by the Oregon Dunes (e.g. Tenmile Creek, Threemile Creek, Siltcoos River, Clear Creek) also appear to have undergone drowning of their estuaries (at perhaps the same general period between 2600 and 3000 BP) it seems as though Indian populations in the area may well have suffered significant relocation during this relatively short time period.

If, as several authors (e.g. Minor et al 1985; Minor et al 1987; Minor and Toepel 1986; Lyman and Ross 1988) suggest, coastal areas were reasonably fully settled with adequate populations at the end of the Early Littoral stage, then the relatively rapid drowning of key estuaries (e.g. Tahkenitch, North Slough Creek and others) and the resultant abandonment of major sites would have caused significant population pressures on those estuaries along the central coast which have significantly greater hydrologic regimes (e.g. Siuslaw, Umpqua, and Coos rivers) and thus would not have been drowned by the migrating dunes. Existing villages on these major estuaries would have had

to accept new populations from the abandoned villages, or new villages would have had to have been established. Insertion of these displaced groups into existing social patterns would have necessitated a reordering of these patterns, and if agreements could not be reached easily, there would have been greater potential for conflict between displaced groups and those already settled in unaffected villages. In either case an increased pressure would have been placed on a diminishing resource base in the 40 mile long stretch of coast now occupied by the Oregon Dunes. Such pressures could well have resulted in increased sedentism, territoriality, and "ownership" of key resources. Evidence to test this hypothesis awaits archaeologists in both the Hauser site and other sites along the major estuaries still existing in the area.

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